



REPUBLIC OF SIERRA LEONE
MINISTRY OF HEALTH AND SANITATION
NON-COMMUNICABLE DISEASES (NCDs)
STRATEGIC PLAN
2020-2024

23 February 2020



Table of contents

Foreword	4
Acknowledgements	5
Abbreviations.....	6
Executive Summary	9
1 Country background.....	14
1.1 Country profile.....	14
1.2 Key health indicators	15
1.3 Country health system - summary.....	16
2 Global NCD situation	18
2.1 Global NCD status	18
2.1.1 Psychosocial and socioeconomic effects of NCDs.....	18
2.2 Global NCD Governance and Action.....	19
2.3 NCD Agenda: 5 diseases x 5 modifiable shared risk factors	20
2.3.1 Recommended interventions.....	20
3 Sierra Leone NCD situation	21
3.1 NCD status in Sierra Leone - Summary.....	21
3.2 NCD risk factors in Sierra Leone - Summary	23
3.3 NCDs in the Sierra Leone health system.....	24
3.3.1 Leadership and Governance	24
3.3.2 NCD Financing	28
3.3.3 HRH for NCD.....	28
3.3.4 NCD Service delivery	28
3.3.5 Drugs, supplies, equipment	33
3.3.6 M&E including surveillance and research	33
3.3.7 Partnerships	34
3.3.8 Communities	35
4 Rationale for the strategic plan, its relation to policy and implementation plans and development process.....	36
5 Guiding principles.....	37
6 Strategic Plan Goal and Objectives	37
6.1 Goal.....	37
6.2 Strategic Objectives	38
7 NCD Priority intervention areas	38
7.1 Leadership and Governance	38
7.2 Health promotion	39
7.3 NCD services	39

8	Strategic objectives and broad activities	40
8.1	SO1: To reinforce leadership and strengthen capacity of the health system for prevention and control of NCDs	41
8.2	SO2: To mobilize sustainable funding for NCD activities at all levels	45
8.3	SO3: To promote healthy lifestyles and reduce risk factors using health promotion strategies.	45
8.4	SO4: To strengthen NCD prevention, screening, diagnosis, management and care at all levels through implementation of practical, cost-effective and evidence-based interventions at all levels of care	47
8.5	SO5: To strengthen partnerships and establish a network of relevant stakeholders for surveillance, prevention, screening, diagnosis, management and care of NCDs.	48
8.6	SO6: To establish systems for monitoring and evaluation (including research and surveillance) to provide evidence for decision making and to assess effectiveness of promotion, prevention and control measures for NCDs at all levels of the healthcare system.....	49
9	Indicative budget by Strategic Objective	51
10	Proposed M&E Framework	51
	Annex 1: Country Health System	59
	Annex 2: NCD status in Sierra Leone	63
	Annex 3: NCD Risk Factors in Sierra Leone	69
	Annex 4: NCD Programs and supporters / implementers in Sierra Leone	74
	Annex 5: Proposed M&E framework - Indicator definitions and calculations.....	76
	Annex 6: References and notes	85

List of Figures

Figure 1: Poverty contributes to NCDs and NCDs contribute to poverty. (source WHO, 2011 ¹⁶)	19
Figure 2: NCDs in the Sustainable Development Goals (SDGs)	19
Figure 3: Global Voluntary Targets for NCD, 2013	19
Figure 4: 5x5 NCD Agenda	20
Figure 5: Components of WHO PEN (Adapted from 2018 New Delhi training manual) ³⁴	21
Figure 6: Estimated Sierra Leone Mortality contributions – 2016	22
Figure 7: Projected premature mortality trends against global voluntary mortality reduction targets, 2016-2025	22
Figure 8: Estimated Sierra Leone Mortality contributions – 2016	63
Figure 9: Projected premature mortality trends against global voluntary mortality reduction targets, 2016-2025	63

List of Tables

Table 1: Selected Key Health indicators, Sierra Leone	15
Table 2: Overview of the 16 "Best Buys" ⁹⁹	20
Table 3: NCD, Injuries, Mental Health – Current and Planned (bold) Governance/ coordination	27
Table 4: 2018 Morbidities in DHIS 2.0 by level and type ^{*153}	63
Table 5: Other NCD conditions: prevalence and incidence, 2017, Sierra Leone	67
Table 6: Health problems that cause the most disability, Sierra Leone 2017 (adapted from IHME ¹²⁹)	68
Table 7: Risk factors for death and disability (DALY) combined, Sierra Leone 2017 – NCD risk factors in bold (adapted from IHME ¹²⁹)	69
Table 8: Combined risk factors from STEPS 2009	73

Foreword



Non-communicable Diseases (NCDs) are a major cause of disability and premature death and contributes substantially to the escalating costs of health care. Their onset is often deceptive and in Sierra Leone, patients often present themselves when the disease is advanced, and generally when in middle age. Over 80% of mortality from NCDs is caused by four main NCDs- cardiovascular disorders, cancer, diabetes mellitus and chronic obstructive pulmonary disease.

These four major NCDs share similar risk factors. Modification of risk factors has been shown to reduce mortality and morbidity in people with diagnosed or undiagnosed NCDs.

Recommendations have been made for the reduction of NCD risk factors through changes in lifestyles, primary prevention, screening and early diagnosis. This strategic plan provides guidance on the interventions needed to reduce the burden of NCDs in the country.

Given that many conditions are preventable, every health care interaction should include prevention support. When patients are thoroughly provided with information and skills to reduce health risks, they are more likely to reduce/stop alcohol and substance abuse, stop using tobacco products, eat healthy foods, engage in physical activity, request for screening, and subsequently seek medical attention early. These risk reducing behaviours can intensely reduce the long-term burden and health care demands of chronic conditions.

A collaborative management approach at the primary health care level with patients, their families and other health care actors is a must to efficiently prevent many major contributors to the burden of disease. Screening for NCDs should be integrated at the primary health care (PHC) level.

In conclusion, this strategic plan is intended to be the basis of national response to burden of NCDs in line with the UN political declaration on NCDs and the Global Action Plan 2013-2020.

Hon. Dr. Alpha Tejan Wurie, (Ass. Prof.)

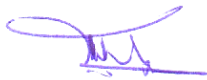
Minister of Health and Sanitation

Acknowledgements



The Ministry of Health and Sanitation would like to take this opportunity to first and foremost thank the World Bank for funding the development of this strategic plan. Special thanks are also extended to member of the Non-communicable Diseases and Mental Health (NCD&MH) Directorate within the Ministry of Health and Sanitation for overseeing and coordinating the development of this plan.

The Ministry would like to acknowledge the multitude of contributions made by the World Bank, World Health Organization (WHO), Sierra Leone Cancer Registry, Sierra Leone Police, Clinton Health Access Initiative, Partners in Health, Health Education Division, Food and Nutrition Directorate, School and Adolescent Health Programme, Directorate of Policy, Planning and Information, King's Partnership, Office of the Chief Community Health Officer and Foundation for Rural Development Sierra Leone, for their determined efforts in making this plan a reality. Special appreciations are also extended to Dr. Owizz Koroma, Forensic Pathologist and Dr. James B. W. Russell, Consultant Physician, for their tireless efforts in bringing this plan to completion. Lastly, the Ministry of Health and Sanitation would like to acknowledge Dr. Heidi Jalloh-Vos and Mr. Michael Conteh for coordinating the various stakeholders who participated in the development of this strategic plan.



Rev. Canon Dr. Thomas T. Samba
Chief Medical Officer

Abbreviations

ACE	Angiotensin-Converting Enzyme
AIDS	Acquired Immune Deficiency Syndrome
B-EmONC	Basic Emergency Obstetric and Neonatal Care
BMI	Body Mass Index
BP	Blood Pressure
BP	Blood Pressure
BPEHS	Basic Package of Essential Health Services
BSE	Breast Self-Examination
C-EmONC	Comprehensive Emergency Obstetric and Neonatal Care
CDC	Centers for Disease Control and Prevention
CHA	Community Health Assistant
CHC	Community Health Centre
CHO	Community Health Officer
CHO-MLTP	Community Health Officer-Management & Leadership Training Program
CHP	Community Health Post
CHW	Community Health Worker
CO	Carbon monoxide
COMAHS	College of Medicine and Allied Health Sciences
COPD	Chronic Obstructive Pulmonary Disease
CPCU	Connaught Palliative Care Unit
CRD	Chronic Respiratory Diseases
CT	Computer Tomography
CVD	Cardiovascular Diseases
DALY	Disability Adjusted Life Year
DBP	Diastolic Blood Pressure
DDMS	Directorate of Drugs and Medical Supplies
DDPC	Directorate of Disease Prevention and Control
DFID	Department for International Development (UKAID)
DHIS	District Health Information System
DHMT	District Health Management Team
DHRH	Directorate for Human Resources for Health (MOHS)
DHS	Demographic Health Survey
DNCD&MH	Directorate of NCDs and Mental Health
DPPI	Directorate of Policy, Planning and Information
DRCH	Directorate of Reproductive and Child Health
DTNR	Directorate of Training, NCDs and Research
DTP	Diphtheria-tetanus-pertussis
ECG	Electrocardiography
ELISA	Enzyme-Linked ImmunoSorbent Assay
EmONC	Emergency Obstetric and Neonatal Care
EPA	Environment Protection Agency
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FBO	Faith-Based Organisation
FCTC	Framework Convention for Tobacco Control
FHCI	Free Health Care Initiative
FMC	Facility Management Committee
FoRUT	Foundation for Rural and Urban Transformation
FSU	Family Support Unit (Police)
G6PD	Glucose-6-phosphate dehydrogenase
GBD	Global Burden of Disease
GDP	Gross Domestic Product
Globocan	Global Cancer Observatory
GoSL	Government of Sierra Leone
HBsAg	hepatitis B surface antigen
HCV	Hepatitis C Virus
HiB	Haemophilus Influenzae type B
HIV	Human Immunodeficiency Virus
HMC	Health Management Committee

HMIS	Health Management Information System
HPV	Human Papillomavirus
HRH	Human Resources for Health
I\$	International Dollar
IAEA	International Atomic Energy Agency
IATI	International Aid Transparency Initiative
iCCM	integrated Community Case Management
ICT	Information and Communication Technology
IDSR	Integrated Disease Surveillance and Response
IEC/BCC	Information, Education, Communication / Behaviour Change Communication
IHME	Institute for Health Metrics and Evaluation
IHPAU	Integrated Health Project Administration Unit
iHRIS	integrated Human Resource Information System
imPACT	Integrated Mission of Programme of Action for Cancer
ISSV	Integrated Supportive Supervision
LGFD	Local Government Finance Department
LMIC	Low- and Middle-Income Country
LMIS	Logistic Management Information System
M&E	Monitoring & Evaluation
MAFFS	Ministry of Agriculture, Forestry and Food Security
MBSSE	Ministry of Basic and Senior Secondary Education
MCHAide	Mother and Child Health Aide
MCHP	Mother and Child Health Post
MDAa	Ministries, Departments, Agencies
MET	Metabolic Equivalent of Task
MIC	Ministry of Information and Communications
MICS	Multiple Indicator Cluster Survey
MLSS	Ministry of Labour and Social Security
MMR	Ministry of Mineral Resources
MoF	Ministry of Finance
MoHS	Ministry of Health and Sanitation
MTHE	Ministry of Technical & Higher Education
MVPA	Moderate to Vigorous Physical Activities
NASSIT	National Social Security and Insurance Trust
NCD	Non-Communicable Disease
NCDI	Non-Communicable Diseases and Injuries Commission
NCPD	National Commission for Person with Disabilities
NEMS	National Emergency Medical Services
NGO	Non-Governmental Organisation
NHA	National Health Accounts
NHSSP	National Health Sector Strategic Plan
NMSA	National Medical Supplies Agency
NO ₂	Nitrogen dioxide
NPPU	National Pharmaceutical Procurement Unit
NSPRA	Nuclear Safety and Radiation Protection Authority
O ₃	Ozone
ODCH	Ola During Children's Hospital
OPD	Outpatient Department
PAH	Polycyclic Aromatic Hydrocarbon
PCMH	Princess Christian Maternity Hospital
PEN	Package of Essential Noncommunicable disease interventions
PHU	Peripheral Health Unit
PHUF	PHU data collection form
PIH	Partners in Health
PM ₁₀	Particulate matter less than 10 micron in diameter
PM _{2.5}	Particulate matter less than 2.5 micron in diameter
PWD	People living with Disability
RBG	Random Blood Glucose
RH/FP	Reproductive Health / Family Planning
RMNCAH	Reproductive, Maternal, Neonatal, Child and Adolescent Health

RMNCH	Reproductive, Maternal, Neonatal, Child Health
RRIV	Report Request Issue Voucher (LMIS)
RTA	Road Traffic Accident
SARA	Service Availability and Readiness Assessment
SBP	Systolic Blood Pressure
SCD	Sickle Cell Disease
SD	Standard Deviation
SDG	Sustainable Development Goal
SDI	Service Delivery Indicator
SECHN	State Enrolled Community Health Nurse
SLAPA	Sierra Leone Alcohol Policy Alliance
SLeSHI	Sierra Leone Social Health Insurance
SLIHS	Sierra Leone Integrated Household Survey
SLL	Sierra Leone Leone
SLMS	Sierra Leone Micronutrient Survey
SLP	Sierra Leone Police
SLRA	Sierra Leone Road Authority
SLRSA	Sierra Leone Road Safety Authority
SLSCS	Sierra Leone Sickle Cell Society
SO	Strategic Objective
SO ₂	Sulphur dioxide
SOP	Standard Operational Procedure
SRN	State Registered Nurse
STEPS	STEPwise approach to Surveillance
STI	Sexually Transmitted Infection
SUN	Scaling Up Nutrition initiative
SWSLCC	South Wales Sierra Leone Cancer Care Link
TB	Tuberculosis
TBA	Traditional Birth Attendant
TBD	To be determined
THET	Total Health Expenditure
TWG	Technical Working Group
UHC	Universal Health Coverage
UN	United Nations
UNCRPD	United Nations Convention on the rights of persons with disabilities
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USD	United States Dollar
VDC	Village Development Committee
VIJI	Verna Iscandari-Johnson Initiative
VOC	Volatile Organic Compound
VSO	Voluntary Services Overseas
WHO	World Health Organization
YLD	Year Lived with Disability

Executive Summary

Country background

Sierra Leone is a small West-African country with a young population (41.6% below 15 years) and a life expectancy of around 50 years. The country scores low on the Human Development and the Gender Inequality indexes: 184 and 150 respectively of the 189 countries in 2017. Development and economic growth and development have been hampered by a decade long civil war (1991-2002) and in more recent years by emergencies: the Ebola outbreak (2014-2016) and the Freetown landslides (August 2017). This is compounded further by an ongoing 2% population growth. Estimated poverty rates are above 50%.

Key health indicators show that Sierra Leone remains a country with high mortality and fertility rates and significant morbidity from preventable causes like malaria and malnutrition also due to considerable disease risk factor levels. There are relatively low health service coverage rates combined with a high out of pocket health expenditure.

Health services in the country are mostly delivered through a public system with 3 levels (Peripheral Health Units (PHUs), district and regional and tertiary hospitals). The country health systems have many challenges especially in the areas of leadership and governance, financing, human resources and drugs, supplies and equipment.

Global NCD situation

Non-Communicable Diseases (NCDs) are not transmissible, not infectious and often chronic conditions with long duration resulting from a combination of genetic, physiological, environmental and behavioural factors. NCDs are closely linked to poverty and contribute to further poverty through, among others, catastrophic health costs and loss of bread winners. Every year there are 41 million NCD deaths, which are 71% of all global deaths. Of these almost 80% are due to cardiovascular diseases, cancers, respiratory diseases and diabetes, of which over 75% in Low- and Middle-Income Countries (LMICs). Premature deaths – taking place between ages 30 to 69 years – contribute to more than one third of NCD deaths, of which over 85% take place in LMICs like Sierra Leone. Over 80% of these premature deaths are from the 4 conditions mentioned above. NCDs leads to poverty at household level, which in turn leads to NCDs. There are also psychosocial consequences for the affected individuals and their surroundings, including loss of position in the family or community, stigma, misconceptions and necessary lifestyle changes.

Increased global attention for NCD prevention and control has led to high-level United Nations (UN) and World Health Organization (WHO) meetings and several global and African strategies (Diet, physical activity and health strategy -2004; harmful use of alcohol strategies – 2010; Global action plan and monitoring framework for prevention and control of NCDs - 2013 – replacing the previous global strategy) using a multisector approach. The global action plan aims for better NCD management in all aspects, including detection, screening, treatment and palliative care. The plan emphasizes the need to strengthen early detection and timely treatment, building on the realization that high impact essential NCD interventions through a primary health care approach can reduce the need for more expensive treatment. Several global initiatives focus on specific (sub-)risk factors. For example, there are specific initiatives for tobacco (Framework Convention for Tobacco Control – FCTC) and salt reduction. Global stakeholders developed global voluntary targets for NCDs in 2013.

The *global NCD agenda* (5x5) contains 5 diseases: cardiovascular diseases, chronic respiratory diseases, cancer, diabetes and mental health. It also contains 5 risk factors: unhealthy diet, tobacco use, harmful use of alcohol, physical inactivity and air pollution.

Global stakeholders have developed several *NCD intervention and recommendation packages*, especially a package of 16 “best buys” (cost-effective, affordable, feasible and scalable in all settings) and the WHO Package of Essential Noncommunicable (PEN) disease interventions for primary health care in low-resource settings. The 16 best buys focus on tobacco use (tax, packaging,

advertising/promotion/sponsorship, smoke-free public places, education), harmful use of alcohol (tax, advertising, availability), unhealthy diets (reformulate food, supportive environments, education), physical inactivity (education), Cardiovascular diseases and diabetes mellitus (drug therapy and counselling) and cancer (vaccination and screening).

PEN is a set of cost-effective intervention that can be delivered to an acceptable quality of care even in resource-poor settings. PEN includes clinical protocols for addressing cardiovascular risk, diabetes, prevention of renal disease, management of bronchial asthma and Chronic Obstructive Pulmonary Disease (COPD) in low resource settings through a PHC approach, a protocol for early referral of individuals suspected of cancer in low resource settings, tools for rapid assessment of capacity in primary care and for costing of primary care programs and evidence based guidance on self-care of NCDs.

Sierra Leone NCD situation

Non-Communicable Diseases (NCDs) including injuries contribute to 41% of mortality in Sierra Leone in 2016. There are an estimated 29,700 deaths every year in Sierra Leone because of NCDs. The 2016 premature death risk in Sierra Leone was 30%. Sierra Leone is not on track to reach the WHO 2025 global target (25% reduction of premature death from the 4 main NCDs) for females. It is estimated 9700 lives can be saved in Sierra Leone by 2025 by implementing all WHO “best buys”, which are cost-effective evidence-based NCD interventions.

The cardiovascular diseases ischemic heart disease and stroke rank 4th and 6th among the causes of death for 2017 in Sierra Leone. The most frequent cancers in Sierra Leone are breast, liver, prostate, cervix and colorectum cancers. Prevalence of diabetes is estimated at 3.3% for 2017. A 2002 Ministry of Health and Sanitation (MoHS) mental conditions needs assessment reported prevalence rates of 2 percent for psychosis, 4 percent for severe depression, 4 percent for severe substance abuse, 1 percent for mental disability and 1 percent for epilepsy. Injuries and violence are common with 12.4% of the population having at least one traumatic injury in the preceding year, and 33.9% (women) / 26.0% (men) experiencing any form (emotional, physical, sexual) intimate partner violence in the previous 12 months. Other NCD conditions of relevance for Sierra Leone are hemoglobinopathies and haemolytic anaemias (including sickle cell trait/disease and Glucose-6-phosphate dehydrogenase (G6PD) deficiency), neurological disorders (mostly headache disorders), digestive diseases (mostly liver cirrhosis), skin and subcutaneous diseases, sense organ diseases and musculoskeletal disorders (mostly low back and neck pain). Six NCD conditions (headache disorders, low back pain, depressive disorders, diabetes, blindness and vision impairment and age-related hearing loss) are in the top 10 of disability causes for Sierra Leone. Disability prevalence in national surveys ranges from 1.3 to 9.2%. The most common types of disability in 2015 were physical disability caused by polio (21.8%) and partial sightedness (15.2%). The main impairments are anaemia (53%), vision loss (14%) and hearing loss (12%).

Key NCD Risk factors consist of both modifiable behaviours (tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets and air pollution) and metabolic risk factors (raised or elevated blood pressure (hypertension), overweight/obesity, hyperglycaemia and hyperlipidaemia. The top-10 of risk factors for death and disability combined in Sierra Leone in 2017 contain 7 NCD risk factors (air pollution, high blood pressure, dietary risks, alcohol use, tobacco, high fasting plasma blood glucose and high body mass index).

Sierra Leone has high levels of NCD risk factors. The 2009 STEPS (STEPwise approach to Surveillance) survey found that 70-75% of the population had 1-2 NCD risk factors, while 27.0% had 3 or more NCD risk factors. 77% of over 40 years Bo adults in a study in 2018 had at least 1 NCD risk factor, with 25% using tobacco, over 90% adding salt during food preparation, 50% having hypertension, 27% being overweight or obese and 6.7% having hypercholesterolaemia.

While Sierra Leone is a signatory to various global commitments regarding NCDs including the UN Sustainable Development Goals (SDGs) 2030, the Framework Convention on Tobacco Control (FCTC, 2009) and the African Union’s Africa Health Strategy (2016-2030), there has been limited attention to NCDs inside Sierra Leone also due to competing RMNCAH (Reproductive, Maternal, Neonatal, Child and

Adolescent Health) and Communicable Disease priorities including a recent Ebola outbreak and limited integration with other health activities. NCDs are not mentioned in the current Health Policy (2002, revised in 2009), however they are - mostly globally - mentioned in the National Development Plan (2019-2023), the Basic Package of Essential Health Services (2015-2020) and National Health Sector Strategic Plan (2017-2021). The first ever national NCD policy and National NCD Strategic Plan (2013-2017) were launched in 2013.

The MoHS Directorate of NCDs and Mental Health (DNCD&MH) – in charge of NCDs, Mental Health and Physiotherapy/Rehabilitation - is in place since 2017. Previously – from around 2011/2012 - NCDs were integrated in the Directorate of Training, NCDs and Research (DTNR). Coordination and implementation of NCD activities at national and district level are limited, also due to financing and quality and quantity of staffing of the Directorate and of NCD services in general. Considering the burden of NCDs in Sierra Leone, the number of recent and ongoing specific NCD interventions and initiatives is very limited with very few funding and implementing partners.

The 2017 Service Availability and Readiness Assessment (SARA) survey shows limited availability of NCD services, with only 11%, 20%, 15%, 3% and 59% of health facilities providing diabetes, cardiovascular, chronic respiratory, cervical cancer and basic surgical services respectively. Advanced diagnostic services were only available at 25% of the 54 hospitals. The same survey showed low availability at health facilities of drugs for cardiovascular diseases (range 4-29%), chronic respiratory diseases (range 2-5%), diabetes (range 3-5%) and other NCD (risk) conditions (range 1-38%), with a similar picture in the recent field assessment for the NCD policy/strategic plan development for basic equipment like blood pressure and blood glucose machines.

Accessibility of NCD services is a problem – for example of all the people over 40 years that knew they had a high fasting blood glucose or hypertension in the recent Bo District CVD (Cardiovascular Diseases) risk factor study (preliminary analysis), 43% and 59% respectively had been screened before, 32.9% and 33.2% respectively had been diagnosed with the condition, 19% and 14.7% respectively were treated and 8.6% and 4.6% respectively actually had a controlled condition.

Community level initiatives are small in number and (geographic) scope. There are limited relationships between the district health providers and authorities with the common first points of call for chronic / NCD conditions at community level: traditional healers, drug peddlers and low-level pharmacies. The Community Health Worker (CHW) scope of work does not include NCDs for now. Preliminary analysis of a recent study shows there is wide variety in the knowledge and understanding of cardiovascular disease risk factors at community level with poor perceptions of treatment options and coexistence of those risk factors.

There are no strategies or other guidelines for NCD health education and only very limited health education materials – often hailing from specific campaigns with a narrow focus (tobacco, salt). Although health education appears almost entirely focussed on RMNCAH, nutrition and communicable diseases; there are opportunities to integrate or piggyback NCD health education in/onto these ongoing activities.

Monitoring and Evaluation (M&E) including surveillance and research of NCD (services) is very limited with no functional M&E framework, only few NCDs included in the routine data collection system of the District Health Information System (DHIS), irregular monitoring visits and only a few research studies. Promising new initiatives like the national cancer registry and the Connaught stroke register only cover limited geographic areas for now.

Rationale for the strategic plan, its relation to policy and implementation plans and development process

This strategic plan was developed as guidance to the practical implementation of the NCD policy for the period 2020-2024, recognizing the need for accelerated prevention and control of NCDs and injuries and their risk factors considering their significant contribution to morbidity and mortality and their related psychosocial impact in Sierra Leone. This will include strengthening of the NCD implementation

framework and the related NCD and Mental Health Directorate (established in 2017). There is also a need for multi-sectorial action considering major determinants and risk factors for NCDs lie outside the health sector. This strategic plan covers both Non-Communicable Diseases and Injuries, and links closely to Mental Health, which had its own policy and strategy launched in 2019. This strategic plan functions as an umbrella for shorter 2-year rolling implementation plans for the areas *Leadership and Governance*, *Health Promotion* and *NCD services*. If needed sub-implementation plans can be developed, for example on Tobacco, Alcohol, and Cancer.

The 2020 policy and the 2020-2024 strategic plan were developed with the assistance of World Bank funds through IHPAU (Integrated Health Project Administration Unit) of the MoHS, which funded the assistance of a consultant who conducted a desk review and 2 joint field assessments, facilitated 4 participatory stakeholder workshops and several participatory stakeholder meetings and assisted with developing the draft policy and plan including indicative costing.

Guiding principles

The guiding principles of the strategic plan are ownership and accountability, integrated people-centred health services, universal health coverage, focused on reducing inequities, encompassing the entire continuum of care, cost-effective evidence-based interventions, cultural relevance, community participation and multisectoral partnerships.

Strategic Plan Goal and Objectives

The goal of the strategic plan is *“To promote the healthy development and wellbeing and the accelerated reduction of preventable NCD deaths among Sierra Leoneans”*. The NCD Strategic Plan Objectives are aligned to the Sustainable Development Goal targets for non-communicable diseases (SDG 3.4), substance abuse (SDG 3.5), road traffic accidents (SDG 3.6), hazardous chemicals and air, water and soil pollution and contamination (SDG 3.9) and the Framework Convention on Tobacco Control (SDG 3.A). They also align to the relevant global strategies and initiatives on diet, physical activity and health (2004, salt reduction 2019) and prevention and control of NCDs (2013 global action plan, 2018 high-level UN General Assembly).

NCD Priority intervention areas

The approach for NCD prevention and control will focus on common NCD conditions in Sierra Leone and their underlying determinants and risk factors and equitable quality NCD services. The approach will integrate and link to approaches for mental conditions covered in the existing Mental Health Policy and Strategic Plan (launched in 2019).

The NCD Policy Framework has *10 priority intervention areas* - which are captured under 3 NCD Policy Domains: Leadership and Governance (*legal framework; national guidelines/Standard Operational Procedures (SOPs)/tools; financing, collaboration and partnerships; capacity building; drugs, essential diagnostics and medical supplies for NCDs and M&E*), Health Promotion (*health promotion and prevention of NCDs*), NCD services (*NCDs management at Primary Health Care level*).

Strategic objectives and broad activities

Strategic Objectives (SOs) and their main strategies are displayed in the table below. Broad activities are defined under each main strategy. It should be noted there is some overlap between the various SOs.

Strategic objective	Main strategies
SO1: To reinforce leadership and strengthen capacity of the health system for prevention and control of NCDs	<ul style="list-style-type: none"> Strengthening and capacity building of NCD Directorate at national and district level Sensitization/ Advocacy at all levels (Other sectors, MoHS) Establish / advocate for legal framework for NCDs and its risk factors (including reduction of presence of risk factors such as salt, sugar, alcohol and tobacco)
SO2: To mobilize sustainable funding for NCD activities at all levels	<ul style="list-style-type: none"> Fundraising for NCDs both in / out of country (GoSL, local councils, in/out country donors)

SO3: To promote healthy lifestyles and reduce risk factors using health promotion strategies.	<ul style="list-style-type: none"> • Promotion of healthy lifestyles through IEC/BCC • Focus on children, adolescents and young people • Provision of enabling environment for behaviour change towards healthy lifestyles
SO4: To strengthen NCD prevention, screening, diagnosis, management and care at all levels through implementation of practical, cost-effective and evidence-based interventions at all levels of care	<ul style="list-style-type: none"> • Training of health workers at all service delivery levels • Strengthen NCD services at PHU and hospital level • Establish and strengthen NCD community /family services and care • Establish guidelines / protocols for NCD prevention, screening diagnosis, management and care
SO5: To strengthen partnerships and establish a network of relevant stakeholders for surveillance, prevention, screening, diagnosis, management and care of NCDs.	<ul style="list-style-type: none"> • Establish national and district level coordination and partnership structures and support NCDI commission and its related TWGs and District NCD committees (see also SO1) • Ensure community level participation in all relevant NCD activities • Participation of all relevant NCD implementers / stakeholders/ partners/ donors in coordination structures and partnership structures • Alignment of all NCD implementers to NCD Directorate/ MoHS NCD guidelines / programs
SO6: To establish systems for monitoring and evaluation (including research and surveillance) to provide evidence for decision making and to assess effectiveness of promotion, prevention and control measures for NCDs at all levels of the healthcare system	<ul style="list-style-type: none"> • Obtain data for action and advocacy • Establish M&E system including surveillance • Support and expand existing cancer registry • Establish NCD Research system

Indicative budget by Strategic Objective

The total indicative cost for the 5 year strategic plan is United States Dollar (USD) 9,205,800, of which 3,048,800 for Leadership & Governance (SO1: 353,60; SO2: 10,000; SO5: 786,200, SO6: 1,899,000), 1,716,000 for Health Promotion (SO3) and 4,441,000 for Services (SO4).

Proposed M&E Framework

The Monitoring and Evaluation, including surveillance and research, of the strategic plan will be implemented by the DNCD&MH together with its partners including the national NCD and Injuries (NCDI) commission and Technical Working Groups (TWGs). The NCD Monitoring and Evaluation (M&E) framework will be further developed based on the current 5-year NCD strategic plan (2020-2024) and the detailed implementation plans. The proposed key indicators include 2 impact indicators and sets of indicators for each of the 6 strategic objectives.

Annexes

The annexes of the strategic plan contain a detailed description of the Country Health System (Annex 1), of the NCD status (Annex 2) and risk factors (Annex 3) in Sierra Leone. Annex 4 contains a detailed table with NCD programs in Sierra Leone and their supporters and/or implementers. The full indicators definitions and related calculations of the proposed M&E framework are provided in Annex 5. The last annex contains the references and notes (Annex 6).

1 Country background

1.1 Country profile

Sierra Leone is a small country on the coast of West Africa bordered by Guinea and Liberia. It has an estimated population in 2019 of 7,901,454 people, of which 59% reside in rural areas and 41.6% are under the age of 15 years. Life expectancy at birth for the period 2015-2020 is estimated to be 48.3 and 50.8 years respectively for males and females.¹

Sierra Leone is divided in 4 provinces (Northern, Eastern, Southern, North Western) and 1 Western Area, see. The Western Area contains the capital Freetown. The provinces are divided into in total 16 districts, which are further sub-divided into 190 chiefdoms.

The official language in Sierra Leone is English. The majority of Sierra Leoneans speak the lingua franca Krio. Next to this there are 14 other local languages. In total there are 15 local ethnic groups, of which the Mende and Temne together compose 63.8% of the population.²

Sierra Leone became independent from Britain in 1961. Sierra Leone is a multiparty democratic republic. Sierra Leone is governed at national level by a one house parliament and at local level by the elected local district and city councils and the elected heads of chiefdoms (paramount chiefs).

Sierra Leone scored low on the Human Development and the Gender Inequality indexes: 184 and 150 respectively of the 189 countries in 2017 ³. In 2015 51.4% of the population above 10 years was literate, with lower literacy levels in rural areas (37.3% vs urban 69.7%), in females (43.9% vs 59.4% in males), and in older people (15-19 years 70.3% vs 23.9% in 60 years and older).²

Development and economic growth and development have been hampered by a decade long civil war (1991-2002) and in more recent years by emergencies: the Ebola outbreak (2014-2016) and the Freetown landslides (August 2017). This is compounded further by an ongoing 2% population growth. Per capita income is an estimated at 506 United States Dollar (USD) in 2018, still below the pre-Ebola level of 660 USD.⁴ The provisional poverty rate for 2018 is 56.7% as compared to 53.8% in 2011, with much higher poverty in rural areas (72.2%) than in urban towns (18.4% in Freetown).^{4,5} Agriculture was the biggest contributor (50%) to the Gross Domestic product (GDP) for the period 2017, followed by services (such as retail trade, transport, banking, education and hotels and restaurant, 36%) and industries (Mining, manufacturing, utilities and construction, 9.7%) and.⁶ The GDP share of industry reduced from 29.8% in 2014 to 9.3% in 2017 due to fluctuations in the outputs of iron ore and diamond mining.

62% of the people above 15 years in Sierra Leone are economically active, with only 2.7% of the population indicating that they were unemployed in 2015. Only a small part (10.5%) of Sierra Leonean employees were paid employees, the vast majority are self-employed (82.7%), with remaining small numbers as (un)paid apprentices or unpaid family workers.²

The Multiple Indicator Cluster Survey of 2017 (MICS 2017) ⁷ shows that 23.0% of the members in households surveyed had access to electricity. Exposure to mass media (defined as at least once a week reading a newspaper or magazine, listening to the radio or watching television) among people aged 15-49 years is limited: 2.8% for women and 7.4% for men. Household telephone (mobile or fixed line), radio, television and computer ownership is respectively 71.5%, 54.7%, 18.2% and 5.7%. Although more men than women (64.8% versus 45.2%) own a mobile phone, mobile phone use is higher among 15-19-year women than men (61.4% versus 47.4%). Use of internet in the last 3 months is still relatively low: 7.5% of women and 10.6% of men.

1.2 Key health indicators

The selected key health indicators in Table 1 show that Sierra Leone remains a country with high mortality and fertility rates and significant morbidity from preventable causes like malaria and malnutrition also due to considerable disease risk factor levels. There are relatively low health service coverage rates combined with a high out of pocket health expenditure. Please note the full results of the Demographic Health Survey (DHS) 2019 ⁹ were not out at the time of developing this table.

Table 1: Selected Key Health indicators, Sierra Leone

Indicator	Value	Source - Year
Mortality		
Life expectancy at birth for the period 2015-2020 (in years)	M 48.3, F 50.8	Census 2015 (projected) ¹
Maternal mortality ratio (per 100,000 women)	1165	DHS 2013 ⁸
Under-5 mortality ratio (per 1,000 children)	122	DHS 2019 ⁹
Neonatal mortality ratio (per 1,000 neonates)	31	DHS 2019
Fertility		
Adolescent birth rate (per 1000 women in the 15-19-year age group)	102	DHS 2019
Total Fertility rate	4.2	DHS 2019
Morbidity		
HIV prevalence, adults 15-49 years	1.5	DHS 2013
STI prevalence (self-reported by adults 15-49 years for the last 12 months)	11%	DHS 2013
TB incidence (per 100,000 population, estimated)	301	WHO TB Country Profile 2017 ¹⁰
Malaria parasite prevalence, 6-59 months (microscopy)	40.1%	MIS 2016
Nutrition		
Exclusive breastfeeding rate 0-5 months of age	54.1%	DHS 2019
Early initiation of breastfeeding	54.5%	MICS 2017 ⁷
Malnutrition U5s – Underweight / Stunting / Wasting prevalence (<2 SD)	13.6% / 29.5% / 5.4%	DHS 2019
Anaemia prevalence in children 6-59 months (<i>mild / moderate / severe</i>)	67.8% (29.9% / 35.2% / 2.7%)	DHS 2019
Anaemia prevalence in women of childbearing age (<i>mild / moderate / severe</i>)	46.5% (23.0% / 22.0% / 1.6%)	DHS 2019
Environmental risk factors		
Use of improved source of drinking water	67.8%	MICS 2017
Use of improved sanitation facilities	48.2%	MICS 2017
Primary reliance on clean fuels and technologies for cooking, space heating and lighting	0.6% / 0.1% / 97.3%	MICS 2017
Noncommunicable diseases		
Tobacco use among persons aged 15+	F: 4.1%, M: 16.6%	MICS 2017
Alcohol use among persons aged 15+	F: 2.0%, M: 11.3%	MICS 2017
Overweight prevalence under 5 years of age	2 SD: 4.5%	DHS 2019
Injuries / harmful traditional practices		
Experienced any form (emotional, physical, sexual) of intimate partner violence in the previous 12 months	F: 33.9%, M: 26.0%	DHS 2013
Prevalence of female genital mutilation/cutting	86.1%	MICS 2017
Early marriage	< 15 years: F 12.9%, M 2.8% < 18 years: F 29.9%, M 6.5%	MICS 2017
Reproductive, maternal, newborn, child and adolescent		
Demand for family planning satisfied with modern methods (currently married)	45.4%	DHS 2019
Contraceptive prevalence rate (currently married)	21.2%	DHS 2019
Antenatal care coverage (at least 4 times)	78.8%	DHS 2019
Institutional deliveries	83.4%	DHS 2019
Postnatal health check for the newborn (first 2 days) / mother (first 2 days)	91.9% / 90.4% Awaits results / 86.0%	MICS 2017 DHS 2019
Immunization		
Full / basic immunization coverage (12-23 months children)	50.0% / 56.3%	DHS 2019
Hepatitis B immunization coverage (12-23 months children) – Penta 3	78.1%	DHS 2019
Malaria		
Use of insecticide treated nets (general / Under five / pregnant women)	52.9% / 59.5% / 60.0 %	MICS 2017

Indicator	Value	Source - Year
Intermittent Preventive Therapy for malaria during pregnancy	26.8%	MICS 2017
Health work force		
Frontline health workers per 10,000 population	9.7	DHRH ¹¹
Health information		
Birth registration	81.1%	MICS 2017
Completeness of HMIS, LMIS and IDSR reporting by facilities	95.8%, 72.7%, 92%	DHIS 2.0 2016 ¹²
Health financing*		
Total expenditure on health as a % of GDP	2013: 11.2%, 2014: 21.7%	NHA 2013, NHA 2014 ¹³
Government expenditure on health as a % of total current expenditure on health	2013: 6.8%, 2014: 7.3%	
Out of pocket payment for health as a % of total current expenditure on health	2013: 61.6%, 2014: 33%	
Externally sourced funding for health as a % of total current expenditure on health (donors)	2013: 24.4%, 2014: 46.9%	
Externally sourced funding for health as a % of total current expenditure on health (NGOs)	2013: 7.2%, 2014: 11.8%	
<i>*Ebola effects in 2014 with huge increase of external funding, therefore also NHA 2013 shown, as there has been no NHA after 2014 so far.</i>		

1.3 Country health system - summary

The full country health system profile is included in Annex 1. This section is a summary.

Leadership and governance of the health sector is guided by a range of documents, including the recently developed Medium-Term National Development Plan ¹⁰¹, the Health Policy ^{102,101} and the National Health Sector Strategic Plan 2017-2021 ¹⁰³. Service delivery is guided by the Basic Package of Essential Services 2015-2020 (BPEHS) ¹⁰⁴ and the Free Health Care Initiative (FHCI) ¹⁰⁵. Both the fiscal and human resources decentralization of the public health sector is incomplete. Coordination is limited between the local councils and the district hospitals that provide the secondary health care and the District Health Management Teams (DHMTs) that are responsible for primary health care through the Peripheral Health Units (PHUs). Also, at national level the coordination through the Health Sector Coordinating Committee and the Health Sector Steering Group is limited. Coordination with other sectors is limited, with a few exceptions where a special entity has been created to improve coordination like the Scaling up Nutrition initiative and the Teenage Pregnancy secretariat. Sierra Leone is a signatory to the Universal Health Coverage 2030 (UHC2030) Global Compact and a UHC scoping visit recommended to progressively expand the benefits package of FHCI to include all life cohorts. ^{106,107}

Health services are provided at three health system levels with 15,000 community health workers (CHWs)¹⁰⁹ and 3 Peripheral Health Units (PHUs) types at the primary level, district hospitals at the secondary level and regional and national / referral hospitals at the tertiary level. In each district there is one (1) Comprehensive Emergency Obstetric and Neonatal Care Centre (C-EmONC) – at hospital level and five (5) Basic Emergency Obstetric and Neonatal Care Centre (B-EmONC) at Community Health Centre (CHC) level. Midwives are based at hospitals and B-EmONC level and supervise maternal and neonatal health activities at the other PHUs. Medical doctors are only based at hospital level. PHUs provide both preventive and curative services and are open either open 24 hours or have a staff on call for out of hours. Mother and Child Health Posts (MCHPs) and Community Health Posts (CHPs) only have observation beds, admission is only possible at CHC or hospital level. A nationwide ambulance referral system called NEMS (National Emergency Medical Services) was set up by MoHS and its partners in 2018. This facilitates referrals from PHUs to hospital level. The 2018 Service Delivery Indicator (SDI) health survey ¹¹⁰ that Sierra Leone continues to lag far behind in maternal, infant and child mortality as compared to its regional peers. While it had better indicators on caseload (10.0 per provider per day), management of maternal and neonatal complications (31%), availability of drugs and infrastructure (56.0% and 47.7%) in the region, indicators on absence rate from facility (29.9% of health providers), diagnostic accuracy (44.5% of clinical cases), adherence to clinical guidelines (30.2%) and equipment (31.9%) availability were considered worse off. A national Quality of Care program (2018) is expected to

help solve the persistent quality of care problems including weak Infection prevention and control practices, diagnostic inaccuracy and case mismanagement.

Community participation and engagement are encouraged through involvement of facility or health management committees and village development committees in health activities and their planning and oversight. These committees are linked to the various PHUs. Similarly, each local council has a health management committee that is engaged in health planning and oversight.

Although there has been an increase of the Government of Sierra Leone (GoSL) allocation to health in recent years, there is still a high out of pocket **expenditure for health**, estimated to be close to 70% of the total health expenditure (THET), with the remaining provided by external sources (24%) and government (6%).^{107,111} The Sierra Leone Social Health Insurance (SLeSHI), enacted in 2017¹¹², has not started yet. There are plans to develop a national health financing policy and strategy. There is no health sector wide budgeting, while GoSL health budget execution is estimated to be about 50%. Funding for FHCI drugs is provided by the Directorate for International Development (DFID, UKAID) and the Government of Sierra Leone, with an increasing commitment for GoSL. With these funds a selected priority set of FHCI drugs and supplies are procured, still leaving a funding gap of more than 50%. The cost-recovery system for drugs that was in place more than 10 years ago has not been revitalised, although there are plans to do so.

The **Human Resources for Health (HRH)** Directorate in the MoHS provides coordination and governance for human resources in the health sector, guided by the Human Resources for Health Policy and Strategy 2017-2021.^{115,116}

Almost 50% of health workers in government health facilities were volunteers in 2016. Most cadre groups meet less than 50% of these staffing norms, with the exception of State Enrolled Community Health Nurses (SECHNs). The health worker density is far below the World Health Organization (WHO) requirements for the SDGs and UHC.^{116,117,118} The recently trained 15,000 CHWs, and also the Traditional Birth Attendants (TBAs) and traditional healers are not part of the Sierra Leone Civil Service.¹¹⁷ Next to a huge staffing gap, other HRH challenges include uneven distribution of existing health workers, limited coordination of pre- and in-service training, insufficient attention to regulation and limited availability and use of HRH data.^{115,116} Some progress was made during 2018, including ongoing recruitment of additional health workers, start of an attendance monitoring system with a related sanctions framework and posting of HRH officers and HRH assistants to each district.

The provision and correct and safe use of **medicines, medical products and technologies** are guided by a whole range of policy documents but there are no policy documents for blood (products) and for traditional medicines/ products.^{107,120,121,122,123,124} There is poor adherence to treatment guidelines.¹⁰⁷ Recently Drug and therapeutic committees have been established / revitalised in 8 hospitals.¹⁰⁷ The National Medical Supplies Agency (NMSA)¹²⁵ is in set up phase and will be responsible for procurement, warehousing and distribution of drugs and medical supplies on behalf of all public institutions throughout Sierra Leone. The focus of supplies is for now on commodities for FHCI, Reproductive Health and Family Planning (RH/FP), nutrition and the 3 Global Fund diseases (TB, HIV, Malaria). There has been no functional national cost-recovery system for many years now.¹⁰⁷

The SARA 2017 survey¹⁰⁸ of all 1284 health facilities showed a low mean availability (31%) of the 24 essential medicine tracer items with none of the health facilities having all items available. The overall mean availability of tracer **basic equipment** at all 1284 health facilities in the country was 57% in 2017. Only 25% had all the items. **High-level diagnostic equipment** (ultrasound machine, X-ray equipment, electrocardiography (ECG) machine and Computer Tomography (CT) scan machine) availability has even more constraints. The overall mean availability of tracer **basic amenities** at all 1284 health facilities in the country was 57% in 2017. Only 2% had all tracer items.¹⁰⁸

There is **no planned preventive maintenance** for physical infrastructure and medical equipment. There are only 2 biomechanical staffs in the MoHS at national level. There is at least one (1) solar technician in each district; taking care of the solar fridges for the vaccines cold chain.

Health information systems are guided by the National Health Sector Information Strategic Plan 2017-2021 and the e-Health strategy and rely on a combination of national surveys ^{7,8,208,209} and service utilisation data such as the DHIS 2.0. The DHIS2.0 system key constraints are in the areas of ICT hardware and digitalisation, data quality and data use of decision making. Supervision is done through Integrated Supportive Supervision (ISSV) combined with special focussed supervision by separate MoHS entities. Joint annual and mid-term reviews are irregular and need strengthening. Research for health implementation in the country is limited, also due to limited in-country research capacity.

2 Global NCD situation

2.1 Global NCD status

Non-Communicable Diseases (NCDs) are not transmissible, not infectious and often chronic conditions with long duration resulting from a combination of genetic, physiological, environmental and behavioural factors. NCDs are closely linked to poverty and contribute to further poverty through catastrophic health costs and loss of bread winners among others. Every year there are 41 million NCD deaths, which are 71% of all global deaths. Of these almost 80% are due to cardiovascular diseases, cancers, respiratory diseases and diabetes, of which over 75% in Low- and Middle-income countries (LMICs). Premature deaths – taking place between ages 30 to 69 years – contribute to more than one third of NCD deaths, of which over 85% take place in LMICs like Sierra Leone. Over 80% of these premature deaths are from the 4 conditions mentioned above.¹⁴

2.1.1 Psychosocial and socioeconomic effects of NCDs

One of the seven key messages of WHO's 2014 Global NCD Status report is that NCDs “*act as key barriers to poverty alleviation and sustainable development*”¹⁵

Globalization, urbanization and population ageing contribute to increased exposure to common modifiable risk factors like unhealthy diets, physical inactivity, tobacco use and harmful use of alcohol. These unhealthy behaviours in turn lead to loss of household income (to sustain those behaviours) and to NCDs. Poor physical status and premature deaths from NCD conditions also contribute to loss of household income. Limited access to effective and equitable health-care services which respond to the needs of people with NCDs lead to high cost of health care and again loss of household income. All combined NCDs lead to poverty at household level, which in turn leads to NCDs.¹⁶ This is illustrated in Figure 1.

NCDs do not only have financial but also psychosocial consequences for the affected individuals and their surroundings. While much is published on the socioeconomic determinants of NCDs, not much is written on the psychosocial effects or impacts of NCDs. Psychosocial effects relate to loss of position in the family or community, stigma, misconceptions and necessary lifestyle changes. For example, individuals living with NCDs conditions that lead to blindness, loss of limbs or sexual dysfunction might have to deal with discrimination and stigma.¹⁷ People with chronic illness are also at greater risk of developing depression, as was shown for example in diabetes patients.¹⁸ Harmful use of alcohol leads to violence and abuse of human rights, particularly women and children's rights.

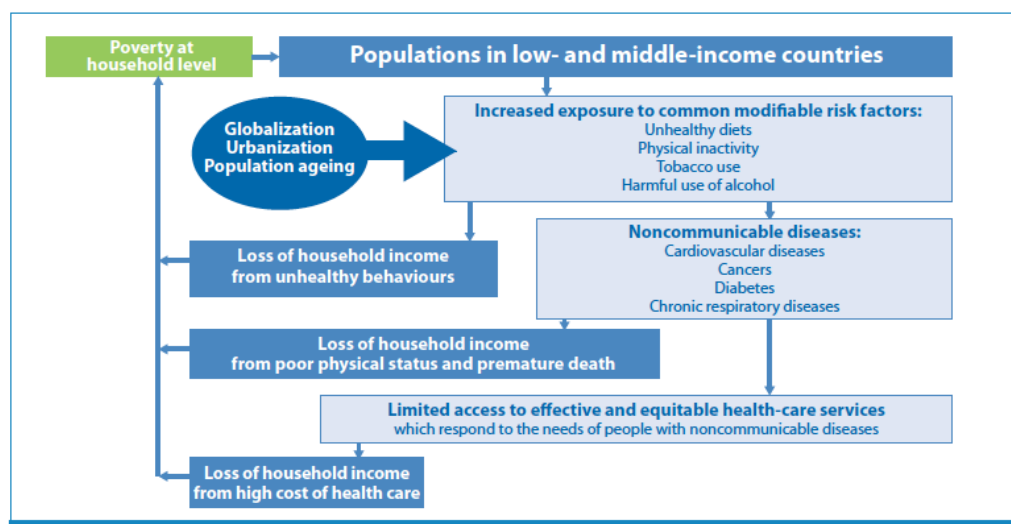


Figure 1: Poverty contributes to NCDs and NCDs contribute to poverty. (source WHO, 2011 ¹⁶)

2.2 Global NCD Governance and Action

The Sustainable Development Goals (SDGs) contain several targets in relation to NCDs starting with a general goal to reduce the premature mortality of all NCDs and specific targets related to substance abuse, road traffic accidents, hazardous chemicals and air, water and soil pollution and tobacco control¹⁹, see Figure 2.

SDG 3.4: By 2030, reduce by one third premature mortality from **non-communicable diseases** through prevention and treatment and promote mental health and well-being.
SDG 3.5: Strengthen the prevention and treatment of **substance abuse**, including narcotic drug abuse and harmful use of alcohol.
SDG 3.6 By 2020, halve the number of global deaths and injuries from **road traffic accidents**.
SDG 3.9 By 2030, substantially reduce the number of deaths and illnesses from **hazardous chemicals and air, water and soil pollution and contamination**.
SDG 3.A Strengthen the implementation of the World Health Organization **Framework Convention on Tobacco Control** in all countries, as appropriate.

Figure 2: NCDs in the Sustainable Development Goals (SDGs)

Since the beginning of this century there is increased attention for NCD prevention and control²⁰, with growing momentum over the last decennium.³⁰ This includes High-Level Meetings of the UN General Assembly on NCDs in 2011, 2014 and 2018 and a WHO global meeting to accelerate progress on NCDs and Mental Health in December 2019²¹. A global Strategy on diet, physical activity and health had already been developed in 2004, with related recommendations on the marketing of foods and non-alcoholic beverages to children in 2010.^{22,23} Also, Global and WHO Africa strategies on the harmful use of alcohol were developed in 2010.^{24,25} A wider global action plan and monitoring framework for prevention and control of NCDs was developed in 2013 – replacing the previous global strategy.²⁶ This global action plan focusses on the 4 key NCD conditions and 4 key modifiable shared risk factors or 4 x 4 agenda using a multi sector approach involving not only the health sector but also finance, transport, education, agriculture, planning and other sectors. The global action plan aims for better NCD management in all aspects, including detection, screening, treatment and palliative care. The plan emphasizes the need to strengthen early detection and timely treatment, building on the realization that high impact essential NCD interventions through a primary health care approach can reduce the need for more expensive treatment. Several global initiatives focus on specific (sub-)risk factors. For example, there are specific

1. A 25% relative reduction in the risk of **premature mortality** from CVD, cancer, diabetes or CRD.
2. At least 10% relative reduction in the **harmful use of alcohol**.
3. A 10% relative reduction in prevalence of **insufficient physical activity**.
4. A 30% relative reduction in mean population intake of **salt/sodium**.
5. A 30% relative reduction in prevalence of current **tobacco use**.
6. A 25% relative reduction in the prevalence of **raised blood pressure**.
7. Halt the rise in **diabetes and obesity**.
8. At least 50% of eligible people receive **drug therapy and counselling** (including glycaemic control) to **prevent heart attacks and strokes**.
9. An 80% availability of the affordable **basic technologies and essential medicines**, including generics, required to treat major

Figure 3: Global Voluntary Targets for NCD, 2013

initiatives for tobacco (WHO Framework Convention for Tobacco Control – FCTC) and salt reduction.^{27,28} Global stakeholders developed global voluntary targets for NCDs in 2013²⁹, see Figure 3.

2.3 NCD Agenda: 5 diseases x 5 modifiable shared risk factors

The recent UN high level meeting transformed the 4 x 4 agenda of 4 key conditions and 4 key modifiable shared risk factors into a 5 x 5 agenda, including air pollution as a risk factor and mental health as disease³⁰, see Figure 4. The key conditions further include: Cardiovascular diseases, Chronic respiratory diseases, Cancer and Diabetes. Risk factors of NCDs include the 5 key modifiable behaviours (tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets, air pollution and underlying determinants) but also 4

Diseases:	Risk factors:
Cardiovascular diseases	Unhealthy diet
Chronic respiratory diseases	Tobacco use
Cancer	Harmful use of alcohol
Diabetes	Physical inactivity
Mental Health	Air pollution

Figure 4: 5x5 NCD Agenda

key metabolic risks (raised blood pressure, overweight/obesity, hyperglycaemia and hyperlipidaemia) and underlying determinants. The leading metabolic risk factor globally is elevated blood pressure - to which 19% of global deaths are attributed-followed by overweight/obesity and raised blood glucose.

Other determinants for NCDs include socio-economic, cultural and other factors including life-style related factors, biological and chemical hazards, physical and built environments including dangerous work places, unplanned urbanization, limited regulation of tobacco, food and beverage industries, unregulated driving under the influence of alcohol and drugs, use of mobile phones when driving and poor road conditions and network.

2.3.1 Recommended interventions

Global stakeholders have developed several intervention and recommendation packages, especially a package of “best buys” and the WHO Package of Essential Noncommunicable (PEN) disease interventions for primary health care in low-resource settings.^{31, 32} The “best buys” are a package of 16 interventions that are cost-effective, affordable, feasible and scalable in all settings, see Table 2. The “best buys” have an average cost-effectiveness ratio of ≤ 100 I\$ (International Dollar)³³ per Disability Adjusted Life Year (DALY) averted in low- and lower middle-income countries. Next to this, there are other effective interventions for which the WHO Choice analysis produced a cost effectiveness that was above this threshold.

Table 2: Overview of the 16 “Best Buys”⁹⁹

Risk Factor/ Disease	Intervention	Detailed description
Tobacco Use	1. Tax	Increase excise taxes and prices on tobacco products
	2. Packaging	Implement plain / standardized packaging and/or large graphic health warnings on all tobacco packages
	3. Advertising, promotion and sponsorship	Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship
	4. Smoke-free public places	Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places and public transport
	5. Educate	Implement effective mass media campaigns that educate the public about the harms of smoking / tobacco use and second-hand smoke
Harmful use of alcohol	6. Tax	Increase excise taxes on alcoholic beverages
	7. Advertising	Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)
	8. Availability	Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale)
Unhealthy diet	9. Reformulate food	Reduce salt intake through the reformulation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals
	10. Supportive environments	Reduce salt intake through the establishment of a supportive environment in public institutions such as hospitals, schools, workplaces and nursing homes, to

		enable lower sodium options to be provided
	11. Educate	Reduce salt intake through a behaviour change communication and mass media campaign
	12. Packaging	Reduce salt intake through the implementation of front-of-pack labelling
Physical inactivity	13. Educate	Implement community-wide public education and awareness campaigns for physical activity which includes a mass media campaign combined with other community-based education, motivational and environmental programmes aimed at supporting behavioural change of physical activity levels
CVD / DM	14. Drug therapy and counselling	Drug therapy (including glycaemic control for diabetes mellitus and control of hypertension using a total risk approach) and counselling to individuals who have had a heart attack or stroke and to persons with high risk ($\geq 30\%$) of a fatal and non-fatal cardiovascular event in the next 10 years
Cancer	15. Vaccinate	Vaccination against human papillomavirus (2 doses) of 9-13-year-old girls
	16. Screening	Prevention of cervical cancer by screening women aged 30–49, either through: <i>Visual inspection with acetic acid, linked with timely treatment of precancerous lesions; Pap smear (cervical cytology) every 3–5 years, linked with timely treatment of precancerous lesions; or Human papillomavirus tests every 5 years linked with timely treatment of precancerous lesions</i>

According to WHO, PEN is an “*innovative and action-oriented set of cost-effective interventions that can be delivered to an acceptable quality of care, even in resource-poor settings*”. PEN’s components are displayed in Figure 5.³⁴ PEN is not supposed to be a stand-alone basic package; it is supposed to be integrated in primary health care.

- Integrated clinical protocol and other tools for addressing cardiovascular risk, diabetes and prevention of renal disease in low resource settings through a PHC approach
- Clinical protocols for management of bronchial asthma and COPD in low resource settings through a PHC approach
- Protocol for early referral of individuals suspected of cancer in low resource settings
- Tool for rapid assessment of capacity in primary care
- Tools for costing primary care programs
- Evidence based guidance on self-care of NCDs

Figure 5: Components of WHO PEN (Adapted from 2018 New Delhi training manual)³⁴

A ‘PEN-Plus’ strategy is currently under discussion for first-level hospitals, based on experiences in Rwanda and other countries. The aim of PEN-Plus is to alleviate the burden of unaddressed, severe NCDs among rural populations through decentralized, integrated outpatient services at first-level hospitals with as objectives: 1. To support integrated disease surveillance aimed at accurately quantifying the burden of NCDs, including severe diseases, their risk factors and determinants in both urban and rural settings. 2. To strengthen the access to and quality of care for severe NCDs at first-level hospitals through targeted health sector policies that fosters the PEN-Plus approach and 3. To improve the capacity of health care personnel, especially mid-level providers, at first-level hospitals to provide integrated care for severe NCDs.³⁵

3 Sierra Leone NCD situation

3.1 NCD status in Sierra Leone - Summary

The NCD status in Sierra Leone is included in Annex 2. This section is a summary.

Non-Communicable Diseases (NCDs) including injuries contributed to 41% of mortality in Sierra Leone in 2016 ¹²⁷, see Figure 6. It is estimated that there are 29,700 deaths every year in Sierra Leone because of NCDs, of which 14,000 males and 15,700 females. Sierra Leone is not on track to reach the 2025 global target (25% reduction of premature death from the 4 main NCDs) for females, see Figure 7. The 2016 premature death risk in Sierra Leone was 30% (male 28%, female 33%). ^{127,128} It is estimated 9700 lives can be saved in Sierra Leone by 2025 by implementing all WHO “best buys”, which are cost-effective evidence-based NCD interventions which are discussed in section 2.3.1. ³²

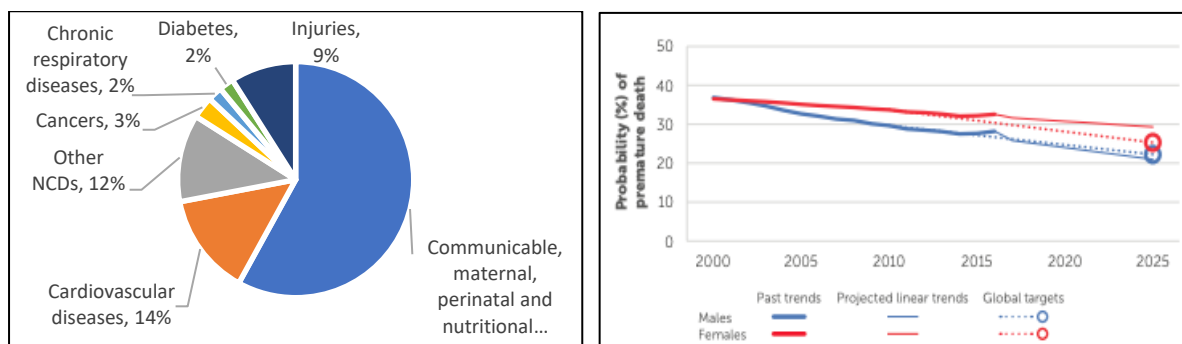


Figure 6: Estimated Sierra Leone Mortality contributions – 2016 Figure 7: Projected premature mortality trends against global voluntary mortality reduction targets, 2016–2025

In the top 10 causes of death for 2017 ischemic heart disease and stroke rank 4th and 6th respectively. Ischemic heart disease ranks 10th in the top 10 of premature death causes.

Six NCD conditions (headache disorders, low back pain, depressive disorders, diabetes, blindness and vision impairment and age-related hearing loss) are in the top 10 of disability causes.¹²⁹

The most frequent cancers in Sierra Leone are breast, liver, prostate, cervix and colorectum cancers.¹³² Whilst cancers in children are generally rarer there remain significant numbers of cases with key identifiable tumours including Burkitt's Lymphoma, Retinoblastoma and Wilms' (nephroblastoma).¹³³

Prevalence rates for diabetes in various studies range from 0.0% to 7.0%^{155,156,157}, with a recent prevalence of 3.5% in adults over 40 years in Bo district and a Global Burden of Disease (GBD) 2017 estimate of 3.3%.^{151,154}

For mental conditions, a 2002 MoHS needs assessment reported prevalence rates of 2 percent for psychosis, 4 percent for severe depression, 4 percent for severe substance abuse, 1 percent for mental disability and 1 percent for epilepsy, while the 2016 WHO NCD country profile for Sierra Leone estimates a suicide mortality rate of 9.7 per 100,000.^{159,127}

In 2013, 51% and 33% of ever-married 15-49 year women and men had experienced any form (emotional, physical, sexual) of intimate partner violence, with 33.9% of women and 26.0% of men experiencing it in the previous 12 months.⁸ A 2012 nationwide survey among 1,843 households showed that 23.95% 3,645 respondents had at least one lifetime traumatic injury, while 12.4% had at least one traumatic injury in the preceding year.¹⁶⁰

Beyond the 5 conditions of the 5x5 agenda and injuries there are several other NCD conditions of relevance for Sierra Leone. Most important are hemoglobinopathies and haemolytic anaemias, neurological disorders (mostly headache disorders), digestive diseases (mostly liver cirrhosis), skin and subcutaneous diseases, sense organ diseases and musculoskeletal disorders (mostly low back and neck pain). For the first category, the most common are sickle cell and G6PD deficiency.^{1,151,154}

Disability prevalence ranges from 1.3% (Census 2015¹⁶⁴) and 2.4% (Census 2004¹⁶⁵) to 9.2% (Multiple Indicator Cluster Survey - MICS 2017⁷), with differences possibly due to different measurement methods. Other estimates based on limited evidence suggest prevalence rates of 7-10% with some as high as 24%.^{166,167,168,169} The most common types of disability in 2015 were physical disability caused by polio (21.8%) and partial sightedness (15.2%).¹⁶⁴ The estimated main causes of years lived with disability (YLDs) in Sierra Leone for 2017 were dietary iron deficiency, headache disorders, low back pain, depressive disorders and onchocerciasis.¹⁷⁰

The main impairments according to their estimated population prevalence based on the 2017 GBD study are anaemia (53%), vision loss (14%) and hearing loss (12%).^{1,151,154}

3.2 NCD risk factors in Sierra Leone - Summary

The NCD risk factors in Sierra Leone are described in detail in Annex 3. This section is a summary.

Key NCD Risk factors consist of both modifiable behaviours and metabolic risks. Key modifiable behaviours include tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets and air pollution. Key metabolic risk factors include raised or elevated blood pressure (hypertension), overweight/obesity, hyperglycaemia and hyperlipidaemia.

The top-10 of risk factors for death and disability combined in Sierra Leone contain 7 NCD risk factors ((air pollution, high blood pressure, dietary risks, alcohol use, tobacco, high fasting plasma blood glucose and high body mass index).¹²⁹

Sierra Leone has high levels of NCD risk factors. The 2009 STEPS survey^{174, 175} found that 70-75% of the population had 1-2 NCD risk factors, while 27.0% (M 31.5%, F 22.6%) had 3 or more NCD risk factors. 77% of > 40 years Bo District adults (2018) had at least 1 NCD risk factor.¹⁵⁷

Tobacco use is high, especially in males, with 25.8% (M 43.1%, F 10.5%) in STEPS 2009 study^{174, 175}, 26% (M) and 4% (F) in DHS 2013⁸ and 25% in adults over 40 years in Bo District in 2018¹⁵⁷. 3,330 deaths per year in Sierra Leone are attributable to tobacco, resulting in 1.5% of GDP loss. 6 priority FCTC interventions (Raising cigarette taxes, protecting people from tobacco smoke, warning labels, plain packaging, mass media campaigns and bans on advertising) can avert 19,900 deaths over 15 years and thus avoid Sierra Leone Leone (SLL) 1.9 billion economic losses.¹⁷⁶

16.4% of the population had a low level of activity in 2009 (STEPS)¹⁷⁴, while less than 10% of over 40 years adults in Bo in 2018 had a low level of activity (preliminary analysis).¹⁵⁷

Current alcohol use was 17.2% (M 24.4%, F 10.9%) in 2009 (STEPS)¹⁷⁴, and 11.3% for males and 2.0% for females in 2017 (MICS)⁷. Women whose husbands are often drunk are more likely (67%) to experience any form of violence (emotional, physical or sexual) than women whose husbands do not drink alcohol (48%) (DHS 2013).⁸

Unhealthy diets remain a problem in Sierra Leone with in the 2009 STEPS^{174, 175} 91% and in an 2018 study around 80% (over 40 year adults Bo District study preliminary analysis¹⁵⁷) of adults eating less than 5 servings of fruits/vegetables per day. Problems start at a young age with only 54.1% exclusive breastfeeding at 6 months (DHS 2019⁹) and a low (24.2%) dietary diversity for 6-23 months children (MICS 2017)⁷. Over 90% of over 40 year adults add salt to food during preparation in 2018.¹⁵⁷ Anaemia prevalence remains high among 6-59 months (67.8%) and 15-49 years women (46.5%) (DHS 2019⁹), not only thought due to worm infestations and malaria but also due to low intake of iron rich foods.

98.3% of household members lives in household that primarily relied on polluting fuels and technology for cooking, although only 2.6% cooked in poorly ventilated conditions (MICS 2017⁷). 12,441 air pollution attributable deaths (3405 ambient, 9036 household air pollution) in 2016.¹⁸⁶ Studies in 2010/2011 found a poor ambient air quality in Freetown¹⁹⁰ and more acute respiratory tract infections in children in wood stove than in charcoal stove households and dangerous levels of air pollutants in wood/charcoal stove households.^{191,192,193,194}

The 2009 STEPS survey^{174, 175} found that 34.8% (M 36.6%, F 33.1%) of the respondents had a raised blood pressure or were currently on medication for raised blood pressure. The hypertension prevalence in non-national studies of the general population in Sierra Leone ranges from 12% to 50%^{157,196,197,198}, while it ranges from 11% to 68% in patient populations^{199,200,201,202,203,204}.

Overweight prevalence in national surveys are higher for females (13.4% to 28.7%, 2008-2017) than for males (6.7% 2013, 16.2% 2009). Obesity prevalence in females (5.0 to 10.8% 2008-2017) are also higher

than in males (1.5% 2013, 4.8% 2009). Overweight or obesity prevalence among pre-school children ranges from 2.6% to 16.9% (2010-2017).^{7,8,174,175,207,208,209,210}

A recent Bo District Cardiovascular Disease (CVD) risk factor study in Bo District in 2071 adults aged over 40 years found that 27% was overweight or had obesity. The same study found hypercholesterolaemia in 6.7% of these adults.¹⁵⁷

3.3 NCDs in the Sierra Leone health system

The status of NCDs in the Sierra Leone health systems is discussed in the following sections on Leadership and Governance; NCD financing; HRH for NCD; Service delivery; Drugs, supplies, equipment; M&E including surveillance and research; Partnerships; Communities and Recent and ongoing NCD interventions and initiatives.

3.3.1 Leadership and Governance

3.3.1.1 *International treaties and national legislation*

While Sierra Leone is a signatory to various global commitments regarding NCDs including the UN Sustainable Development Goals (SDGs) 2030^{19, 128}, the WHO Framework Convention on Tobacco Control (FCTC, 2009)²⁷ and the African Union's Africa Health Strategy (2016-2030)³⁶, there has been limited attention to NCDs inside Sierra Leone also due to competing RMNCAH and Communicable Disease priorities including a recent Ebola outbreak and limited integration with other health activities.

The Finance (amendment) act of 2018³⁷ provides the legal background for an increase of Tobacco and Alcohol taxes; important in reducing access to these NCD risk factors.

Sierra Leone is a signatory to the United Nations Convention on the rights of persons with disabilities (UNCPRD)³⁸. The Constitution of Sierra Leone³⁹ protects people living with disability (PWD) from discrimination and contains the obligation to actively promote and safeguard the care and welfare of PWD. The 2007 Child Right Act⁴⁰ contains the right of a disable child to be treated in a dignified manner and the right to special care, education and training wherever possible to develop his or her maximum potential and be self-reliant. The 2011 Persons with Disability Act⁴¹ commits to free medical services in public health facilities for all PWD, the establishment of the National Commission for Persons with Disabilities (NCPD) with a MoHS representative member, the set-up of a health board for issuing Permanent Disability Certificates and compulsory screening for early signs of disability for any child that visits a health centre for medical treatment. In addition, it provides for the establishment of a 'National Development Fund' for PWD, a component which should support the cost of assistive devices and related services.^{42,43}

The Public Health Ordinance (1960)⁴⁴ and its amendment (2004)⁴⁵ do not mention mental health or disability or NCDs.

Mental Health legislation in Sierra Leone is limited to the outdated and inadequate Lunacy Act, first passed in 1902⁴⁶ and the Dangerous Drugs Ordinance of 1926⁴⁷, relevant for substance use disorders.

The Liquor Act (1924)⁴⁸, Palm Wine Ordinance (1927)⁴⁹, and Liquor Licensing Ordinance (1960)⁵⁰ provide very limited restrictions for alcohol control and do not address the current realities of harmful use of alcohol.

The Medium-Term National Development Plan (2019-2023)¹⁰¹ aims to have, by 2023, a system to strengthen screening and management of non-communicable diseases and mental health.

3.3.1.2 *NCDs in MoHS policy and strategy documents*

The first ever **National NCD policy and National NCD Strategic Plan** (2013-2017)^{51,52} were launched in 2013. The old Mental Health Policy and Plan (2017-2021) were recently replaced by a **new Mental Policy and Plan** for the period 2019-2023.^{53,54}

The outdated **National Tobacco control strategy** (2012-2016) is now captured in this strategic plan document, and in the newly developed **Investment case for Tobacco control** ¹⁷⁶, with plans to develop a detailed Tobacco control implementation plan.

The **Annual Work Plan of the National Rehabilitation Programme**⁵⁵ for 2019 has 3 goals: strengthening existing rehabilitation services, increasing the number of physiotherapy and rehabilitation departments across the country (from 6 centres to 10 centres) and raising the profile of physiotherapy and rehabilitation. The outdated **Physical and Rehabilitation Medicine Policy** (2012)⁵⁶ is now captured in this strategic plan document.

NCDs are not mentioned in the current **Health Policy** (2002, revised in 2009)¹⁰², although it mentions disabilities and mental illness as 2 of the 10 national health priorities. NCDs however are, although not very specific, mentioned in the Basic Package of Essential Health Services (BPEHS, 2015-2020)¹⁰⁴ and National Health Sector Strategic Plan (NHSSP, 2017-2021)¹⁰³.

The **NHSSP** only mentions NCDs in sections on SDGs and relative mortality and risk factors, without having a special NCD section or specific NCD strategies. The NHSSP only mentions disability in relation to prevention (Buruli ulcer, leprosy, vaccine-preventable diseases), but there is no strategy or section for disability. The only rehabilitation that is mentioned is rehabilitative eye services. The NHSSP has a special section on mental health, aiming for a sustainable and accessible mental health system and advocating for new mental health legislation to replace the outdate Lunacy act.

The **BPEHS** only mentions identification, management and referral for children with disabilities. There is no special section for PWD or rehabilitation, although it is mentioned that MCH Aides can be trained to provide basic physical rehabilitation services at CHC level and that hospitals should have two rehabilitation workers. For NCDs only Nutrition Counselling for Management of NCDs is specifically mentioned (at all health facility levels).

The **National Health Promotion Strategy** 2017-2021 ⁵⁷ has only two short mentions on NCDs, with as priority areas for health promotion: tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol.

The **National Food and Nutrition Security Policy** 2012-2016 ⁵⁸ has one (1) short section on NCDs – noting an increase of hospital admissions NCD conditions with dietary implications (hypertension, diabetes, gout) and overweight in children.

The **National Essential Medicines list** (2016) contains several sections relevant to NCDs and mental health, including: anticonvulsants/anti-epileptics, antineoplastic/immunosuppressive medicines, cardiovascular (including antihypertensives), medicines acting on the endocrine system (including insulin and oral antidiabetic drugs), psychotherapeutic medicines, analgesics and medicines acting on the respiratory tract. The basic equipment list contains a BP machine amongst other equipment.

The Pharmacy Board is currently working on a new version of the **Standard Treatment Guidelines**, and DNCD&MH is providing inputs for NCD risk factors and conditions.

The **National Health Laboratory Strategic Plan** 2016-2020 contains ¹²⁴ a sample budget outline for the PHU, which shows that the focus is almost entirely on communicable diseases, with as the only NCD test materials: mixed (including glucose) test strips and hand-held point of care blood glucose testing machines.

In general, not much has been done on the popularization of the NCD-related and other policy documents in the health sector.

3.3.1.3 Other MDAs and NCDs

For NCDs the MoHS relates outside the health sector to many different MDAs (Ministries, Departments and Agencies), the most important MDAs are highlighted below.

The **multisector National Food and Nutrition Security Implementation Plan 2013-2017**⁵⁹, part of the multisector Scaling Up Nutrition (SUN) initiative, contains a special section and multiple mentions of NCDs. In this plan the MoHS is responsible for developing and disseminating health education materials on nutritional care and support for NCDs, integrating management of common NCDs into the Primary Health Care and the Community, developing appropriate dietary guidelines on NCDs and conducting a new STEPS survey and establish community and facility surveillance system for adults 25-64 years old. **MAFFS** (Ministry of Agriculture, Forestry and Food Security) is to use Farmer Field Schools and agricultural extension to support dissemination of key messages on preventive measures for NCDs (healthy lifestyle), provide support to small scale farmers in the production of varieties of local nutritious foods, disseminate promotion materials on the consumption of micronutrient rich foods, establish school and kitchen gardens and provide technical support in food fortification and bio-fortification. The **MBSSE** (Ministry of Basic and Senior Secondary Education) and **MTHE** (Ministry of Technical & Higher Education), and training institutions are to review curricula for all (primary, secondary and tertiary) levels to incorporate emerging issues/developments on micronutrients and to support implementation of school gardens. **Non-Governmental Organisations (NGOs) and Faith-based Organisations (FBOs)** are to assist with nutrition and healthy lifestyle education and dissemination of IEC materials.

Various actors are responsible for food safety and hygiene including MoHS (Directorate of Disease Prevention and Control - DDPC) **MAFFS**, **MMR** (Ministry of Mineral Resources), **Ministry of Trade and Industry**, and the Education ministries **MBSSE** and **MTHE**.

The **Environment Protection Agency (EPA)** Act established EPA in 2008, which includes a Board of Directors with one representative of the Ministry of Health and Sanitation. EPA is to *“provide for the effective protection of the environment and other related matters”*. According to the act, EPA has, among others, the mandate to provide standards, guidelines and methods to prevent and/or control air pollution.⁶⁰ Air pollution related activities in EPA’ strategic plan 2017-2021⁶¹ include Pollution control including being equipped to regularly monitor air samples by 2021. Guidelines for air quality were already developed under the previous strategic plan (2012-2016). The Sierra Leone national climate change strategy and action plan (2013)⁶² contains plans to develop a Green Technology Mass Transport System for the entire Western Area, promote renewable energy, reduce greenhouse gas emissions from fuel wood consumption through energy-efficient cooking stoves and reduce methane emissions through improved waste management. All these measures will contribute to reduced air pollution.

The Road Transport Authority Act (1996)⁶³ established the **Sierra Leone Road Safety Authority (SLRSA)**. The main functions of SLSRA are the regulation and development of the road transport industry, including the registration and licensing of vehicles, the licensing of drivers, the prescription of routes for passengers and good transportation and the promotion of road safety. The Road Traffic Act (2007)⁶⁴ contains a whole set of road safety provisions, also in relation to driving under the influence of alcohol and drugs. The first National Road Safety Policy, Strategic Plan and Trust Fund were launched on 23 November 2013 in Freetown.⁶⁵

The **Ministry of Youth Affairs**⁶⁶ and the **National Youth Commission** (2009)^{67,68} are also engaged in health promotion, which seems to focus mostly on Sexual and Reproductive Health. The 2012 revised Sierra Leone youth policy⁶⁹ contains four (4) health promotion areas: HIV and AIDS, sexual and reproductive health (including teenage pregnancies), substance and drug abuse and young people with disability. The last 2 areas fall within the mandate of the DNCD&MH.

Although the **Ministry of Information and Communications (MIC)**⁷⁰ website is silent on health matters and especially NCD matters at the beginning of 2020, MIC could play a key role in NCD communications in the future, especially now that they are represented in the NCDI commission.

The **Ministry of Basic and Senior Secondary Education (MBSSE)** plays a key role in health promotion in schools. This Ministry has a range of Directorates, with the ones relevant for NCDs being Physical Health Education Directorate⁷¹, the Schools Feeding Coordination Unit⁷² and the Guidance and Counselling Unit.⁷³

3.3.1.4 NCD & Mental Health Directorate

The **Directorate of NCDs and Mental Health (DNCD&MH)** is in place since 2017. Previously – from around 2011/2012 - NCDs were integrated in the Directorate of Training, NCDs and Research (DTNR). The 2019 national level staff includes a very limited staff of 1 Director, 6 technical staff and 3 support staff who together cover NCDs, Mental Health and Physiotherapy/Rehabilitation. There are no NCD focal points at district level. Each district has one (1) mental health nurse, based at the hospital. There are 6 Physiotherapy/Rehabilitation centres in the country.

There is limited advocacy within and outside the health sector for NCDs which is also due to limited staff in the Directorate and limited NCD focused staff at district and lower levels. For now, there is also limited coordination of NCD activities, however the DNCD&MH plans to have (assistant) focal persons at district level (DHMT and hospital).

There are very limited national or district coordination, partnership and/or oversight structures for NCDs, and there is limited involvement of stakeholders. At national level there is a multisectoral Tobacco Task Force (2017) and a Mental Health Steering Committee. DNCD&MH just established an NCDI commission (2019) and a TWG for NCDs (2019). FoRUT (Foundation for Rural and Urban Transformation) is the lead agency in the Sierra Leone Alcohol Policy Alliance (SLAPA) launched 28th October 2015. SLAPA advocates for changes to Alcohol and Drugs Development policies in Sierra Leone to contribute to reduction of harmful of effects of alcohol and drugs.

Please consult Table 3 below for the current and planned (focal persons) organization of oversight and coordination.

Table 3: NCD, Injuries, Mental Health – Current and Planned (bold) Governance/ coordination

Level	Entity	Chair / Co-Chair	Secretariat	Focal point in NCD & MH Directorate	Focal point at District level	Related policies /strategic plan / implementation plan
Multi-sector	NCD & Injuries commission	NCD&MH Director / Chief Medical Officer PIH	NCD&MH Directorate	NCD & MH Director	District Officer Medical	NCD Policy, NCD Strategic plan
Health sector	Mental Health steering committee	NCD&MH Director /NA	NCD&MH Directorate	Mental Health Committee National Focal Point	NCD focal person in the DHMT Assistant NCD focal person in the hospital: Mental Health nurse based in district/regional hospital	Mental Health Policy and Strategic Plan
	TWG - NCDs	NCD&MH Director	NCD&MH Directorate	NCD TWG National Focal Point		NCD Policy and Strategic Plan, all NCD implementation plans
	Tobacco Task Force (multi-sectorial)	NCD&MH/Director / NA	NCD&MH Directorate	Tobacco National Focal Point		Tobacco legislation implementation plan
	TWG – Alcohol (multi-sectorial)	NCD&MH Director / SLAPA	ForUT	Alcohol National Focal Point		

3.3.2 NCD Financing

The DNCD&MH 2019 budget line in the MoHS budget⁷⁴ is very small as compared to the budget for the Reproductive and Child Health Directorate and the Disease Prevention and Control Directorate, two directorates that, like DNCD&MH, are to cater for a large subset of or even the total population.

The MoHS, next to core DNCD&MH funding, also contains separate budget lines for the construction of an Accidents & Emergencies Department at Waterloo Hospital, preparatory work for the construction of a State of the Art Cancer Unit, providing disability friendly environment in the health facility and construction of a Diagnostic Medical Centre. These additional separate budget lines are not always under the control of the DNCD&MH.

There are no separate GoSL NCD budget or activity lines or nationwide NCD programs at district level in either the local council budgets or in the regional hospital budgets. Some local councils have a small supplementary drug budget, which is used to buy some NCD but also non-NCD drugs.

Tertiary hospitals (Bo, Makeni, Kenema and 3 hospitals in Freetown: Ola During Children's Hospital (ODCH), Princess Christian Maternity Hospital (PCMH), Connaught) seem to have more problems with accessing supplies and funds than the district hospitals, likely because tertiary hospital funds are not decentralized. This means they receive their funds from national level unlike district hospitals that receive them from district level.

Non-GoSL support to NCD interventions and activities is also limited, with only a limited number of actors and funders as is shown in Annex 4.

3.3.3 HRH for NCD

Specific HRH for NCDs is very limited. Each district has 1 mental health nurse. There are no internal medicine specialists upcountry, and only a few in the capital Freetown.

The field assessment showed that pre-service training of middle cadres (CHO, CHA, SECHN, SRN) is not always fit for NCD purposes. For example, there is a need to know better how to measure/interpret blood pressures, what are the NCD risk factors and what the best diets to prevent NCDs but also what are the best diets for NCD patients like diabetics. There is a need for curriculum review and strengthening in light of the increasing NCD burden. The NCD desk guide⁷⁶ might be a useful tool for both the review and for teaching on NCDs.

The Community Health Officer-Management & Leadership Training program (CHO-MLTP) ^{203, 204} conducted a hypertension screening project in 69 CHCs in 10 districts in the country. This led to increased knowledge on hypertension screening among staff, which motivated staff to check the blood pressure regularly for patients. The project also improved teamwork and supervision at the facility.

3.3.4 NCD Service delivery

Considering the burden of NCDs in Sierra Leone, the number of recent and ongoing specific NCD interventions and initiatives is very limited. A 2018 NCD scoping study found only 1 out of 28 documents that actually described and assessed an intervention.⁷⁵

The field assessment confirmed that the service delivery is focussed on RMNCAH (including nutrition) and communicable diseases, especially at PHU level. Many respondents mentioned that most commonly seen NCD conditions were hypertension, diabetes, peptic ulcer disease and their complications like stroke. Injuries from Road Traffic Accidents (RTAs) are common in health facilities close to highways.

Prevention, screening, early detection, diagnosis, management and care are all very limited throughout the country, with only few exceptions. Service constraints consist at all levels. There is limited health education for prevention. There are limited laboratory tests and equipment for diagnosis. There is lack of drugs, supplies and right hospital diet for treatment of NCD patients. There is lack of laboratory testing,

medical equipment, drugs and supplies for monitoring and management of patients. Care for NCD patients in the form of rehabilitation and family/community care is also lacking. Prevention of liver cancer through national Hepatitis B immunization has started through inclusion of Hepatitis B in the pentavalent vaccine (together with Hib and DTP) at 6, 10 and 14 weeks. There is however no Hepatitis B birth dose. There was a Hepatitis B Jan-August 2016 immunization coverage of 94.5% (DHIS data)⁹², a 2017 immunization coverage of 84.9% among 12-23 months children in the MICS 2017⁷ and a 78.1% 2019 coverage in the DHS 2019.⁹ There is however no regular influenza vaccination or Human Papillomavirus (HPV) vaccination. There were HPV vaccination demonstration programs in 2 districts of Sierra Leone in 2013, with further work disrupted by the Ebola outbreak.⁹²

In general, there are no separate clinics or wards for NCDs. Some hospitals (e.g. Kono Government Hospital/Partners in Health (PIH), Connaught hospital) have started running special NCD clinic days, however there is no policy on NCD OPDs or NCD clinic days. Some NGOs support NCD services, for example in Connaught, Ola During Children's, Kono and Masanga hospitals, for detail see Annex 4.

There are no national NCD treatment guidelines in use, although there is a draft NCD desk guide⁷⁶ (still to be launched, disseminated) and there are existing NCD guidelines at some hospitals and even a mobile application at Connaught hospital. In general, there is a variety of treatments going on with confusion on the right first line treatment, for example some staff think methyldopa is first line for non-pregnant hypertension.

A 2017 survey of all 1284 health facilities in the country showed that **diabetes services** (diagnosis and/or management) were available in 11% of facilities, with 79% of hospitals, 25% of CHCs, 5% of CHPs, 2% of MCHPs and 34% of clinics providing these services. Only 9% of government-managed facilities provided these services as compared to 52% of private facilities. Diabetes services are more available in urban facilities (34%) than in rural facilities (7%).¹⁰⁸

Of all the people over 40 years that knew they had a high fasting blood glucose in the recent Bo District CVD risk factor study (preliminary analysis), only 43% had been screened before, 32.9% had been diagnosed with diabetes, 19% were treated and 8.6% actually had a controlled diabetes. Only 22% of people who knew they had diabetes accessed health care in the last 3 months, mostly at a hospital and seen by a medical doctor. 10% actually attended because of the diabetes mellitus. The people who did not access health care thought it was not necessary (34%) or it was too expensive (30%).¹⁵⁷ This indicates awareness, access and availability problems in all stages in the diabetes continuum of care.

The same 2017 survey shows that **cardiovascular services** (diagnosis and/or management) were available at 20% of facilities, provided by 75% hospitals, 36% of CHCs, 17% of CHPs, 10% of MCHPs and 36% of clinics. Only 17% of government-managed facilities provided these services as compared to 56% of private facilities. Cardiovascular services are more available in urban facilities (45%) than in rural facilities (15%).¹⁰⁸

King's Sierra Leone Partnership will support the establishment of **specialised stroke care** at Connaught hospital by end of 2020, providing specialised stroke care aiming to improve stroke outcomes. In 2021 the project intends to share implementation lessons and advise on appropriate levels of care and care pathways at other hospitals in 2021. Subsequently, in 2022, King's Sierra Leone Partnership together with COMAHS (College of Medicine and Allied Health Sciences) intends to publish the specific stroke outcomes, risk factors and epidemiology.^{130, 212}

In the STEPS 2009 survey^{174, 175} there were 34.8% of adults with **high blood pressure** (or already on blood pressure medication), however 93.2% (M 94.1%, F 92.4%) of the respondents with raised blood pressure were currently not on medication for this.

Of all the people over 40 years with a raised blood pressure in the recent Bo District CVD risk factor study (preliminary analysis), only 59.2% had been screened before, 33.2% had been diagnosed with hypertension, 14.7% were treated and 4.6% actually had a controlled hypertension. Only 10% of people who knew they had hypertension accessed health care in the last 3 months, mostly at a hospital and seen

by a medical doctor. 70% actually attended because of the hypertension. The people who did not access health care thought it was not necessary (63%) or it was too expensive (37%).¹⁵⁷ This indicates awareness, access and availability problems in all stages in the hypertension continuum of care.

The CHO-MLTP program^{203,204} conducted a quality improvement **hypertension screening** project in 69 CHCs in 10 districts. Of the 34,607 eligible adult outpatients ≥ 20 yrs 23,701 (68%) were screened for hypertension, of which 2,696 (11%) had elevated blood pressure using the WHO definition ($\geq 140/90$ mmHg) and 1,592 (59%) were initiated on drugs and non-pharmacologic treatment. The program noted that there were no national guidelines or SOPs on hypertension treatment and control at the PHUs.

Chronic respiratory disease (CRD) services (diagnosis and/or management) were available at 15% of facilities in 2017, with 74% of the hospitals; 32% of the CHCs; 27% of the clinics; 9% CHPs and 6% of the MCHPs providing these services. Only 13% of government-managed facilities provided these services as compared to 46% of private facilities. CRD services are more available in urban facilities (36%) than in rural facilities (11%).¹⁰⁸

Cancer detection services are limited in Sierra Leone. A few NGOs train women on how to conduct Clinical Breast Examination to check for lumps and physical changes that might indicate breast cancer. They also give advice for further investigation and treatment for symptomatic women.⁹²

Cervical cancer services were only available at 3% of the facilities in 2017, with only 2% of 1203 public facilities providing the service, and 20% of the private facilities. Availability is higher in urban (11%) than in rural (2%) facilities.¹⁰⁸

There are limited qualified staff and appropriate equipment for all specialities involved in **cancer services**. In 2016 there were no oncologists in the country, oncological surgery is limited as is chemotherapy⁹². The first ever radiotherapy facility in country is currently in development⁷⁷ by the Nuclear Safety and Radiation Protection Authority (NSPRA), an entity under the Ministry of Energy, together with the International Atomic Energy Agency (IAEA). The MoHS radiologist stated in the September 2019 IAEA bulletin that the President's flagship program aims to make publicly available by 2023 radiotherapy and nuclear medicine services at Lakka Hospital.⁷⁸ Histopathology services are limited and only erratically available in Freetown at one public (Connaught) and one private hospital (Choithram Memorial hospital). Diagnostic imaging is also limited, with only few CT (Computer Tomography)-scanners, X-ray and ultrasound machines.⁹²

Several of the children's cancers that are more commonly diagnosed in Sierra Leone are potentially curable. A service has been established (since 2017) at **Ola During Children's Hospital**, which focuses on the **delivery of chemotherapy** for Burkitt's lymphoma, Wilms' tumour and Retinoblastoma for children with potentially curable disease and delivers effective **palliative care** for others. The service is delivered in partnership with the paediatric surgical team at Connaught and ophthalmology team at Sightsavers in Freetown and strongly supported by a paediatric team from Wales, United Kingdom (see also Annex 4). Over 80 children have been managed through the unit of whom about 35% have received chemotherapy. The lead doctor is currently supported by World Child Cancer (see also Annex 4) to undergo a 2-year training program in Ghana. It is hoped that the service will expand to treat children with leukaemia and other cancers as it develops. As noted above the diagnostic facilities (imaging and pathology) available to support this service are very limited and the provision of chemotherapy and supportive drugs needs to be sustainable.^{79,133}

The 2016 imPACT mission found that the majority (80%) of cancer patients present with locally advanced and/or metastatic disease due to a range of reasons including lack of access to health care and initial treatment by traditional healers.⁹² **Palliative care** is therefore crucial, but is limited to a few actors including a palliative care clinic at Connaught hospital and the Shepherd's Hospice, both in Freetown. As of 2016 palliative was not part of the physician's training curriculum. Access to strong opioids is also limited.⁹²

The **Connaught Palliative Care Unit (CPCU)** at the Connaught hospital is providing palliative care services at the Connaught hospital and home based care services since September 2018, initially set up in association with King's Sierra Leone. The CPCU is also involved in sourcing opioid supplies, palliative care training of PCU team members and hospital staff, teaching medical students, supporting palliative and cancer care at ODCH, networking with other cancer and palliative care organisations and research.⁷⁹ The team consists of a specialist palliative care doctor, a registered nurse and 2 SECHNs. In its first 15 months the CPCU saw 168 patients¹³⁴: on average 11 patients (range 4-21) per month, 95% of those were referred for cancer. Referrals came not only from inside the hospital, but also from a variety of outside locations. 68% of their patients were female, due to the largest group being breast cancer patients. 25% of the referrals were under 16 years, with among them almost equal males (48.5%) and females (51.5%). The most common conditions among adult (>18 years) palliative patients were breast cancer and hepatocellular cancer, followed by abdominal (including ovarian) and cervical cancer. The most common conditions among paediatric palliative patients were Burkitt's lymphoma and retinoblastoma, followed by Wilms' nephroblastoma and rhabdomyosarcoma.

A scoping exercise by the CPCU in June 2019⁷⁹ found that only 2 of the 14 districts had any designated doctor, nurse or team in the hospital to look after palliative care patients. Most had availability of drugs on Step 1 and Step 2 of the WHO analgesic ladder⁸⁰ for cancer pain, but only 2 (14%) had access to oral morphine, which is part of the essential package of palliative care and pain relief health services⁸¹.

In the 2 facilities which had palliative care personnel, these were primarily for HIV counselling, which historically has been linked to palliative care but as HIV is now treatable as a chronic disease, palliative care needs are becoming more focused on patients with cancer and end organ failure. All respondents were interested in further training in palliative care and commented on the need for a palliative care service to be established in their hospital.

Basic surgical services (ranging from more complex like cricothyroidotomy to simple procedures like suturing) were available in 59% (district range 14% Port Loko district to 70% Tonkolili district) of the 1284 health facilities in 2017, mostly at hospitals – where 9 out of 10 provide these services. 54% of the primary health care facilities offered incision and drainage of abscesses and suturing. There is not much difference between urban and rural (44% vs 45%) and public and private (45% vs 52%).¹⁰⁸

87% of the 54 hospitals offered **comprehensive surgical services** in 2017, however they do not all provide the same set of services. For example, 4% of hospitals offered obstetric fistula repair while 57% of hospitals offered elective hernia repair.¹⁰⁸ In a study in 2012 there was an **unmet surgical need** of more than 90%.⁸²

There are **physiotherapy/rehabilitation** units in 6 districts, with plans to scale this up to 10 districts.⁵⁵

4% of the 1284 health facilities provided **blood transfusion** services in 2017 (district range Western Area Rural 0% to Western Area Urban 15%). There is a clear difference between urban (14%) and rural (2%) and between public (2%) and private (31%).¹⁰⁸

Advanced diagnostic services were available in only 25% of the 54 hospitals in 2017. The most available test was urine dip stick with microscopy (56%) and the least available was HIV antibody testing (ELISA method) (4%). Availabilities of other NCD relevant test were serum electrolytes (15%), liver function test (28%), renal function test (30%) and blood typing and cross matching (33%).¹⁰⁸

The NGO **Sierra Leone Sickle Cell Society (SLSCS)**¹⁶³, founded in 1992, provides services to sickle cell patients in the Freetown area. They have over 2500 sickle cell disease (SCD) patients on their register and had more than 4500 attendances in 2018. The health services provided by SLSCS include, among others: identification of SCD patients; counselling of SCD patients and their families; regular care and maintenance treatment for SCD patients (analgesics, antibiotics, vitamins, anti-malarial prophylaxis, bed nets, leg ulcer care, general health maintenance) and referral for specialized care and investigations. The SLSCS also provides support for hospitals admission and treatment costs and financial support for socially-challenged families affected by SCD. The SLSCS is also involved in sickle cell education, awareness raising and SCD research. The SLSCS is advocating for a unified approach to SCD in Sierra Leone which

includes standard diagnostic procedures, uniform therapy including hydroxy urea, standard immunization procedures, screening of newborns and improved blood transfusion services.

3.3.4.1 Health education

There are no strategies or other guidelines for NCD health education and only very limited health education materials – often hailing from specific campaigns with a narrow focus (tobacco, salt). The salt reduction campaign is currently ongoing in the country for example. Even the few materials available are hardly found displayed in the PHUs and hospitals visited for the field assessment.^{83,84} The health education appears almost entirely focussed on RMNCAH, nutrition and communicable diseases, as could be seen from the health education schedules in various districts. There are however opportunities to integrate into or piggyback onto the ongoing activities such as council radio hours, United Nations Children’s Fund (UNICEF) supported interactive radio sessions and nutrition education activities, especially the ones related to healthy diet.

All respondents in the field assessment mentioned low community awareness of NCDs and their risk factors, with the majority also mentioning traditional explanations for the NCDs like witch gun/craft and other traditional belief and myths. These factors contribute to poor health seeking behaviours for NCDs. Some respondents mentioned that traditional medicine (practitioners) should be incorporated into or linked in some way to the health facility setting to overcome some of these problems.

There are limited health promotion programs for addressing modifiable risk factors in schools; although some workshop respondents mentioned that some education on this is done in the subject “Physical Health Education and promotion”.

The effectiveness of health promotion for NCDs is not documented well for Sierra Leone. Two studies published in 2006 followed up on education in total 1,200 women on breast cancer and the importance of breast health during a “breast week”^{85,86}. The majority (96.6%) of a 10% sample had some knowledge of breast cancer after the week, indicating they were aware of the dangers. 91.7% of the women had never practised Breast Self-Examination (BSE) before the breast week. One year after the week 95% were able to demonstrate an effective BSE method of undertaking BSE.

“World Cancer day” is commemorated each year in Sierra Leone on the 4th of February and is supported by members of the Sierra Leone Cancer Society, supported by a number of charities and organisations with a focus on cancer within Sierra Leone (Including: Thinking Pink, Well woman, Sierra Leone Cancer Charity (Verna Iscandari-Johnson Initiative - VIJI), South Wales – Sierra Leone Cancer Care Link, Cancer Registry)¹³³ The same organisations work throughout the year on cancer prevention and awareness activities, especially regarding breast and cervical cancer.⁷⁹

Transform Freetown 2019-2022⁸⁷, an initiative of the Freetown city council in the areas of Resilience, Human Development, Healthy City and Urban mobility includes a specific target for NCDs (target 2: By 2022, increase by 20% the adoption of healthy behaviours to reduce specific non-communicable conditions (*diabetes, hypertension, reproductive cancers, mental health and substance abuse*). The NCD Transform Freetown Health Working Group is working on a screening and referral pathway and on the Healthy Freetonians’ Campaign: *You life depend pan you lifestyle!* which includes health awareness days, health festivals and health promoting schools.^{88,89}

3.3.4.2 PWD access to services

The 2011 UN report on Rights of People with Disabilities in Sierra Leone⁹⁰ noted largely indirect discrimination in health access for PWD with transport, accessibility, affordability and communication obstacles. The report also noted the absence of (allocation of) resources to provide free medical care to PWD. People with mental /psychosocial disabilities were particularly disadvantaged due to stigma.

3.3.5 Drugs, supplies, equipment

The 2017 SARA survey ¹⁰⁸ showed low availability at health facilities of items for cardiovascular diseases (Amlodipine or alternative calcium channel blocker 5%, Aspirin 29%, Beta blocker 5%, Enalapril tablet or alternative Angiotensin-converting enzyme (ACE) inhibitor 4%, thiazide 5%), chronic respiratory diseases (beclomethasone inhaler 2%, salbutamol inhaler 5%), diabetes (insulin regular injection 3%, metformin tablet 5%, glibenclamide 3%) and other NCD (risk) conditions (omeprazole tablet or alternative 38%, simvastatin tablet or other statin 2%, carbamazepine tablet 1%, Haloperidol tablet 1%).

The field assessment and the national level stakeholder consultations in 2019 showed that at all levels there are inadequate numbers of functional BP and blood glucose machines in public facilities, while oxygen concentrators are a challenge at hospital level. There are almost no NCD drugs or supplies in public facilities, also due to a non-functional cost recovery system. During the field assessment mostly FHCI, RH/FP and Communicable disease (TB/HIV, malaria) supplies were met at the facilities and the district and hospital medical stores. There are a few exceptions in facilities and districts where a local council has a supplementary drug budget or where NGOs are supporting (e.g. Bo city council and NGO PIH in Kono Government Hospital).

During the CHO-MLTP program ^{203,204} hypertension screening intervention it was noted that there were inadequate blood pressure (BP) machines for hypertension screening and lack of different BP cuff sizes for accurate BP reading. CDC (Centers for Disease Control and Prevention) capacitated the 69 participating CHCs (in 10 districts) with BP machines which facilitated BP checks. The program also noted that there was a widespread stock out of basic essential anti-hypertensive drugs at the primary health care facilities.

3.3.6 M&E including surveillance and research

Regular DHIS / MoHS data collection forms and patient registers are used for NCD service data. This includes PHU forms on morbidity (PHU data collection form 1 (PHUF1)) and mortality (PHUF5) and the hospital in- and outpatient forms (F1, F2). Some relevant information is also found on PHUF7 (semi-permanent data) e.g. presence/functioning of equipment like BP machine, stethoscope, oxygen cylinder and scales. The Report Request Issue Voucher (RRIV) forms capture supply, use and stock level of drugs and other supplies, which includes some NCD items.

There is however limited provision for NCD individual and aggregated data in the current DHIS data tools (forms and registers). For example the during the CHO-MLTP ^{203,204} hypertension screening intervention it was noted that there is no allocated space in the PHU OPD (outpatient department) register to document the blood pressure value. On the morbidity forms many NCD conditions, like CRD, are missing.

PIH developed separate NCD forms and register for use the OPD of the Kono Government Hospital, while a same exercise is ongoing at the OPD of Bo Government Hospital.

The national cancer registry was launched in June 2012 with funding from the Sierra Leone Cancer Charity (VIJI)¹³³ and collects data from 18, mostly urban, health facilities in Western Area Urban and Rural districts.⁹¹ The registry works with one (1) registrar and three (3) data collectors, who do this work mostly on voluntary basis. There is no Sierra Leone legislative framework for the activities of the cancer registry.^{91,92} The Sierra Leone Cancer Registry was recognised internationally by Globocan (Global Cancer Observatory) as the 187th global cancer registry in 2018 and supplies data to inform regional cancer statistics^{91, 132}

A longitudinal prospective stroke register has been established in April 2019 at the tertiary Connaught hospital, this is part of preparations for a stroke study and the set-up of specialised stroke care at the hospital. King's Sierra Leone Partnership together with COMAHS (College of Medicine and Allied Health Sciences) intends to publish the specific stroke outcomes, risk factors and epidemiology in 2022.^{130, 212}

NCD was recently integrated in the ISSV, which has 2 types of cycles: national to district supervision and district to health facility supervision (PHUs, hospitals). Each type is supposed to take place at least twice a year. Beyond that almost no (separate) NCD supervision take place due to funding constraints, sometimes limited supervision is done alongside implementation of other NCD activities.

The National to DHMT ISSV form (A-1) contains a NCD/mental health section with 5 questions: on focal persons, orientation by the DHTM to PHUs and hospitals on policy documents, DHMT watching trend and locations of NCD & MH patients, inclusion of NCD prevention and control in coordination/review meetings and monthly reporting on NCD&MH from health facilities.

The District to PHU ISSV form (C-1) contains an NCD/mental health section with 6 questions: prevention, activity coverage, nr of active trained volunteers on NCDs, health education materials, mental health services and training of PHU staff on mental health care.

The PHU availability and status of documents ISSV form (C-2) contains an NCD/mental health section with 1 question: Records / Report of NCD and mental health. This form also contains many general reporting and recording questions in relation to the DHIS2.0 data tools, which also include NCD and mental health data.

The most recent national NCD Risk factor survey, the STEPS survey ¹⁷⁴ is from 2009, with a planned survey for 2019 pending due to lack of funding. Other national health(-related) surveys do not or only marginally capture NCDs and their risk factors. For example, the Demographic Health Survey (DHS) 2013 does not mention the 5 main NCD conditions, although some risk factors are mentioned (smoking, alcohol in relation to spousal violence, indoor smoke (cooking, smoking)).⁸ The 2017 Multiple Indicator Cluster Survey (MICS) report does not mention the NCDs, but data were collected on NCDs in the U5 verbal autopsy part (diabetes mellitus, asthma, cancer, sickle cell disease, injuries/accidents, kidney/liver disease) and there is risk factor data (alcohol use, smoking, (indoor) smoke from cooking) and disability information.

The questionnaire for the Sierra Leone Integrated Household Survey 2018 (SLIHS) contained mentions of diabetes, hypertension and disability, however the results of this survey have not been published.

M&E of NCD policy, plan and activities has been limited, also due to limited financial and human resources at the DNCD&MH. There is no M&E framework in existence, and no internal or external evaluations or annual review meetings have been implemented. There is no specific training on NCD data collection or NCD surveillance. The Directorate has only 1 vehicle for all activities, including M&E activities.

The NCD Directorate does not produce regular publications like an annual report.

The NCD&MH Directorate is not advocating actively for NCD research. There is no shared NCD research agenda or priority setting exercise.

A scoping study on NCDs by COMAHS ⁷⁵ that searched many databases and sources found only 28 relevant documents, of which 23 were peer-reviewed, 4 were reports and 1 was a strategy document. It is promising that several actors (e.g. King's Sierra Leone Partnership, COMAHS, University of Birmingham) are planning to conduct NCD studies in the future.

3.3.7 Partnerships

NCD Key stakeholders including (current or potential) NCD implementers or funders are limited and uncoordinated.

Only few NGOs are currently involved in specific NCD activities. For example, PIH is supporting NCD OPD days at the Kono Government Hospital combined with home-based management including home visits. VSO (Voluntary Services Overseas) recently conducted a training and provided equipment for NCD screening and management at CHCs in Bombali district. The NGOs supporting Masanga hospital are also providing support for NCD management for in- and outpatients.

Except for support from United Nations Development Program (UNDP) and WHO to selected NCD activities there has so far not been much interest of Health Development Partners to support NCD prevention and control.

There are no NCD coordination or partnership structures such as committees or working groups in existence at district level. There is no or very limited participation of the community level in NCD activities.

3.3.8 Communities

In all districts visited for the field assessment there were limited or even non-existent relationships between the DHMT, hospital, HMC (Health Management Committee) and councils with the common first points of call for chronic / NCD conditions: traditional healers, drug peddlers and low-level pharmacies. Except for the few geographically small initiatives described under NCD financing (see also Annex 4) and NCD service delivery, there are no community level care systems for chronic or NCD conditions.

The CHW scope of work ¹⁰⁹ does not include non-communicable diseases. Some key informants in the field assessment expressed distrust in the health system. Almost all non-health sector respondents mentioned the lack of monitoring and management devices for NCDs at health facilities.

In the Bo District CVD risk factor study (preliminary analysis) ¹⁵⁷ respondents mentioned the choice between traditional medicine, “English” medicine (local clinic or hospital) or self-treatment. Main treatment barriers mentioned were cost (treatment, medicine, transport), insufficient personnel and equipment and long waiting time. Based on this, respondents either decided to not access health care or suffer the consequences of having no more money for food or having to borrow money.

Preliminary analysis of a recent study¹⁵⁷ shows there is wide variety in the knowledge and understanding of cardiovascular disease risk factors at community level with poor perceptions of treatment options and coexistence of those risk factors. Another recent study⁹³ suggests there is adequate basic knowledge on causes and symptoms of common NCDs in both rural and urban areas. There is a tendency to focus on and react to severe symptoms or events. Care seeking is influenced by distance to health facilities, cost of services, previous experiences of care but also by the acuteness of the presentation and personal and community beliefs.

Care seeking for violence is higher among women (55%) than among men (32%), they most often sought help from their families (F 76%, M 70%). ⁸

The hypertension screening project implemented by the CHO-MLTP program ^{203,204} in 69 CHCs in 10 districts was able to increase awareness on NCDs, especially on hypertension, in the communities. CHWs proved effective in creating community awareness and sensitization of community leaders on hypertension, while good collaboration between PHU staff and CHWs enhanced follow-up of patients with elevated blood pressure.

The NGO GOAL used a community engagement approach to address substance use among children and youths in slum and disadvantaged communities in Sierra Leone. ⁹⁴

There is clearly a need for deeper understanding of community perceptions, as well as stronger links with existing community actors⁹³, aiming at a real engagement at community level.

3.3.8.1 Traditional treatment of NCDs in Sierra Leone

Traditional treatment for medical conditions is common in Sierra Leone, both as home or self-treatment and through traditional healers. This might be because they are more familiar to the patient, located closer to them or cheaper and/or also accepting in-kind treatment and also because of traditional explanations of medical conditions. During the field assessment many respondents mentioned the words “witch gun” and “witchcraft” as perceived causes of disease among communities, especially for unexplained and/or more chronic conditions, like NCDs.

In a 2012 nation-wide surgical needs study 21% of the burn cases went to a traditional healer for care.¹⁶¹ More than half (56.9%) of 260 hypertensive patients attending public and private health facilities in Freetown in 2016 used herbal medicine to treat hypertension (alone or combined with other conditions). The most commonly used herbal medicines were honey (33.3%), moringa (30.0%) and garlic (27.3%). 85.1% of the patients did not disclose their herbal medicine use to their health care providers.⁹⁵

There might also be a different interpretation of medical words at community level. For example, the Mende word *haypatensi* was according to one study⁹⁶ not only used during the war time to indicate hypertension, but was also used to mediate lived, traumatic experiences. For example, respondents described how *haypatensi* “attacks” the body and how palpitations seem like gun-shots. Unlike the – often symptom-less – Western hypertension, the local *haypatensi* was recognized through environmental clues and symptoms.

4 Rationale for the strategic plan, its relation to policy and implementation plans and development process

This strategic plan was developed as guidance to the practical implementation of the NCD policy for the period 2020-2024. This policy recognizes the need for accelerated prevention and control of NCDs and injuries and their risk factors considering their significant contribution to morbidity and mortality in Sierra Leone, with 41% of mortality attributed to NCDs and injuries.¹²⁷ The strategic plan also takes into account the psychosocial impact of NCDs on the patients themselves, but also their families and communities.

As described in the previous chapter, there is a currently weak and underfunded coordination and implementation framework for NCDs and injuries and their risk factors, which will need strengthening to adequately prevent and control NCDs and injuries. This includes strengthening of the NCD and Mental Health Directorate (established in 2017), which plays and will play a pivotal role in coordination and governance of NCDs. There is also a need for multi-sectorial action considering major determinants and risk factors for NCDs lie outside the health sector.

This strategic plan covers both Non-Communicable Diseases and Injuries, and links closely to Mental Health, which has its own policy and strategy launched in 2019.^{53,54}

This strategic plan functions as an umbrella for shorter 2-year rolling implementation plans, starting with the period 2020-2022. These 2-year rolling plans will cover the areas *Leadership and Governance* (including Tobacco & Alcohol legislation, general policy environment, coordination and partnerships), *Health Promotion* (Health lifestyle including tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets (incl. salt, sugar and unhealthy fats), air pollution) and *NCD services*. If needed sub-implementation plans can be developed, for example on Tobacco, Alcohol, and Cancer.

The NCD services implementation plan will focus not only on conditions (Cardiovascular diseases, Cancers, Chronic respiratory diseases, Diabetes, Mental Diseases/Conditions (*see also the new Mental Health Policy and Plan*^{53,54}), Chronic Kidney Conditions, Sickle cell etc.) but also on metabolic risk factors (Hypertension, Overweight/Obesity, Hyperglycaemia, Hyperlipidaemia) and specific services such as Prevention, Screening/Early Detection, Diagnosis, Management, Care, Rehabilitation, and Palliative Care.

The 2020 policy and the 2020-2024 strategic plan were developed with the assistance of World Bank funds through IHPAU (Integrated Health Project Administration Unit) of the MoHS, which funded the assistance of a consultant who conducted a desk review and 2 joint field assessments, facilitated 4 participatory stakeholder workshops and several participatory stakeholder meetings and assisted with developing the draft policy and plan including indicative costing.

5 Guiding principles

Ownership and accountability: This strategic plan recognizes the leading role of the government through the Ministry and Health and Sanitation (MoHS) and specifically the NCD&MH Directorate in the MoHS, in development and implementation of and accountability for this plan.

Integrated people-centred health services⁹⁷:

People-centred health services is an approach to care that consciously adopts the perspectives of individuals, families and communities, and sees them as participants as well as beneficiaries of trusted health systems that respond to their needs and preferences in humane and holistic ways. People-centred care requires that people have the education and support they need to make decisions and participate in their own care. It is organized around the health needs and expectations of people rather than diseases.

Integrated health services are health services that are managed and delivered in a way that ensures people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation and palliative care services, at the different levels and sites of care within the health system, and according to their needs, throughout their whole life.

Universal health coverage⁹⁸:

UHC is defined as ensuring that all people have access to the needed health services (including prevention, promotion, treatment, rehabilitation and palliation) of sufficient quality to be effective while also ensuring that the use of these services does not expose the user to financial hardship. Sierra Leone as member of the Universal Health Coverage (UHC) partnership and endorser of the SDGs is moving towards UHC. The NCD strategic plan is aligned to UHC.

Focused on reducing inequities: Interventions must address the need to reduce inequities by considering the social determinants of health to enable the attainment of healthy outcomes by all.

Encompassing the entire continuum of care: This strategic plan affirms the importance of a balanced and interconnected approach to NCDs, from primary prevention to tertiary and palliative care.

Cost-effective evidence-based interventions: The WHO “*Best Buys*”⁹⁹ and other cost-effective evidence-based interventions will assist with reducing preventable morbidity and mortality from NCDs.

Cultural relevance: NCD Policies, programs and services must respect and take into consideration the specific cultural and religious diversity of people within Sierra Leone.

Community participation: Taking into account the key role of prevention and the often long-standing chronic nature of NCDs prevention community participation is essential for the successful implementation of the NCD policy.

Multisectoral partnerships: The occurrence of NCDs and NCD services are influenced by many determinants outside the health sector. This strategic plan will promote and strengthen multisectoral partnerships (governmental and non-governmental including private partners) to adequately prevent and control NCDs.

6 Strategic Plan Goal and Objectives

6.1 Goal

To promote the healthy development and wellbeing and the accelerated reduction of preventable NCD deaths among Sierra Leoneans.

6.2 Strategic Objectives

The NCD Strategic Plan Objectives are aligned to the Sustainable Development Goal targets for non-communicable diseases (SDG 3.4), substance abuse (SDG 3.5), road traffic accidents (SDG 3.6), hazardous chemicals and air, water and soil pollution and contamination (SDG 3.9) and the Framework Convention on Tobacco Control (SDG 3.A). They also align to the relevant global strategies and initiatives on diet, physical activity and health (2004, salt reduction 2019) and prevention and control of NCDs (2013 global action plan, 2018 high-level UN General Assembly).

The NCD Strategic Plan Objectives are:

- To reinforce leadership and strengthen capacity of the health system for prevention and control of NCDs
- To mobilize sustainable funding for NCD activities at all levels
- To promote healthy lifestyles and reduce risk factors using health promotion strategies.
- To strengthen NCD prevention, screening, diagnosis, management and care at all levels through implementation of practical, cost-effective and evidence-based interventions at all levels of care
- To strengthen partnerships and establish a network of relevant stakeholders for surveillance, prevention, screening, diagnosis, management and care of NCDs.
- To establish systems for monitoring and evaluation (including research and surveillance) to provide evidence for decision making and to assess effectiveness of promotion, prevention and control measures for NCD's at all levels of the healthcare system

7 NCD Priority intervention areas

The approach for NCD prevention and control will focus on risk factors and their underlying determinants and equitable quality NCD services. The approach will consider common NCD conditions in Sierra Leone, for example: cardiovascular diseases, cancers, chronic pulmonary diseases, diabetes mellitus, epilepsy, sickle cell disease, chronic kidney disease and injuries; their complications and sequels, and their underlying determinants and risk factors.

The approach will integrate and link to approaches for mental conditions covered in the existing Mental Health Policy and Strategic Plan (launched in 2019).

The NCD Policy Framework has 10 priority intervention areas – in bold italics below - which are captured under 3 NCD Policy Domains: **Leadership and Governance, Health Promotion, NCD services**. All domains and priority intervention areas are actively linked to the existing Mental Health policy framework.

7.1 Leadership and Governance

The ***Legal framework for NCDs and their risk factors*** will amongst others include advocacy for and contribution for development of Tobacco and Alcohol legislation. This will create an enabling environment for practicing healthy lifestyles.

National guidelines, SOPs and tools will be developed for interventions in the relevant policy domain areas Leadership & Governance, Health promotion and NCD services.

Increased NCD ***Financing*** is needed to accelerate NCD prevention and control in Sierra Leone. GoSL stakeholders and development partners will be encouraged to mobilize funds.

The GoSL will lead and strengthen ***collaboration and partnerships*** with key stakeholders and donors to reduce preventable morbidity and mortality from NCDs and increase healthy lifestyles and

enabling environments. The National NCD and Injuries Commission (NCDI) and its Technical Working groups will assist with building stronger collaboration and partnerships.

Capacity building for NCDs is needed to ensure the health systems has the required infrastructure, skilled and trained staff and equipment to provide, monitor and oversee NCD activities and services.

For implementation of NCD services it is essential to ensure the availability and affordability of **drugs, essential diagnostics and medical supplies for NCDs** at all levels of health care system and advocate to relevant stakeholders for adequate supplies and inclusion of all necessary NCD commodities in policy documents such as the essential medicines list.

Monitoring and evaluation (M&E) will be needed in the entire NCD continuum of care. NCD prevention, control and surveillance will be integrated into routine Health Management Information System (HMIS) and surveillance systems and NCD research will be promoted to inform policy.

7.2 Health promotion

The policy domain area - **Health promotion and prevention of NCDs** will focus on achieving healthy lifestyles through reduction of the modifiable NCD risk factors such as tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets (including high salt and sugar use) and air pollution. Health promotion will educate the general public on healthy life choices while also providing education to existing NCD patients on how best to care for and manage their respective conditions.

7.3 NCD services

The Domain NCD services will consider **key NCD conditions** in Sierra Leone: Cardiovascular diseases, Cancers, Chronic respiratory diseases, Diabetes, Mental Diseases/Conditions, Chronic Kidney Conditions, Sickle cell etc. This Domain will also consider the key metabolic NCD risk factors: Hypertension, Overweight/Obesity, Hyperglycaemia, Hyperlipidaemia.

Specific services considered under this domain are: Prevention, Screening/Early Detection, Diagnosis, Management, Care, Rehabilitation, and Palliative Care. This also includes NCD clinic days, a National Cancer Hospital and patient support groups.

The priority intervention area - **NCDs management at Primary Health Care level** – will be integrated as a basic NCD package into existing Primary Health Care interventions, with a special focus at the CHC level. In addition, referral pathways between primary, secondary and tertiary facilities will be strengthened.

8 Strategic objectives and broad activities

This strategic plan applies a phased approach, taking into consideration the limited attention to NCDs over the last years and the current low NCD activity and funding levels. Two key cross-cutting strategies are therefore:

- **Integration**, where possible activities are integrated with or piggyback on existing activities and initiatives, such as already ongoing health promotion activities within MoHS and other governmental and non-governmental organisations
- **Advocacy**, advocating for integration with existing activities and for involvement of as much actors and entities, both within and outside the health sector, as possible in NCD activities.

This section shows the 6 strategic objectives with their strategies and broad activities, grouped under 3 time periods: short-term (1-2 years), medium term (3-5 years) and long term (> 5years). Detailed activities will be described in the separate implementation plans for Health Promotion, NCD Services and Leadership and Governance.

8.1 SO1: To reinforce leadership and strengthen capacity of the health system for prevention and control of NCDs

The table below contains the key strategies and broad activities under Strategic Objective 1 (SO1). There is overlap between SO1, SO2 and SO5, please also consult SO2 and SO5.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Strengthening and capacity building of NCD Directorate at national and district level	Organizational capacity assessment of NCD Directorate, resulting in an organizational development and capacity building plan	x		x (repeat)
	Adequately staff NCD Directorate (including pin-coding all staffs)	x		
	Nominate national focal persons for all key NCD areas	x		
	Nominate and support district NCD focal persons (DHMT), including 1 motorbike per district (16 motorbikes) and other equipment	x	x	x
	Nominate and support assistant district NCD focal persons (hospital)	x	x	x
	Annual in-service/on the job training for NCD Directorate staff and (assistant) district NCD focal persons, based on the capacity building plan	x	x	x
	Implement other activities based on the developed organizational development plan	x	x	x
	Development of detailed 2-year rolling implementation and sub-implementation plans for the areas <i>Leadership and Governance, Health Promotion (incl. Tobacco and Alcohol) and NCD services (incl. Cancer)</i>	x	x	x
Sensitization/ Advocacy at all levels (Other sectors, MoHS)	Develop and regularly update NCD advocacy / briefing package/kit for the various target audiences (see also SO2)			
	Advocate to other MoHS entities (DNCD&MH with NCDI commission and relevant TWGs, see SO5): <ul style="list-style-type: none"> Engage in / Advocate for review of essential medicine, supplies and equipment lists and the BPEHS and advocate for reflection of drugs, supplies and equipment for early detection, prevention, treatment and management of NCDs (Directorate of Drugs and Medical Supplies - DDMS, NMSA) Advocate for inclusion of NCD drugs and supplies in revised cost-recovery scheme (DDMS, NMSA) for all levels Advocate for integration of cancer registry in DHIS 2.0 (Directorate for Policy, Planning and Information - DPPI) Advocate for prevention and early detection of NCDs in other Directorates areas of work (e.g. RMNCAH – Directorate of Reproductive and Child Health (DRCH)) Advocate for the inclusion of NCD and NCD risk factors/ cessation in standard treatment guidelines (DDMS) 	x	x	x

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
	<u>Advocate to other line ministries, departments and agencies (DNCD&MH with NCDI commission, see SO5):</u> <ul style="list-style-type: none"> Advocate for improvement / establishment of the physical infrastructure for the prevention of NCDs (Sierra Leone Road Authority (SLRA), SLSRA, Ministry of Works, Ministry of Lands, Housing and Environment) Advocate for the increased availability of fruit and vegetables (MAFFS) Advocate for inclusion of health promotion in primary and secondary school curricula (Ministry of Basic and Secondary School Education - MBSSE) Advocacy on the importance of alcohol-free school environment (MBSSE) Advocacy to review and enforce the drink-driving regulation (SLRSA, Sierra Leone Police -SLP) Advocate for inclusion of mandatory regular physical activities in school curricula (e.g. 2x per week) (MBSSE) Advocate for establishment and maintenance of healthy workplaces (Ministry of Labour and Social Security – MLSS) Advocacy on importance of physical activity (Ministry of Youth and Sports) Advocacy to other relevant line ministries, departments and agencies (e.g. EPA) 	x	x	x
	<u>Increase political / high profile engagement (DNCD&MH with NCDI commission, see SO5)</u> <ul style="list-style-type: none"> Campaign to highlight the incidence, prevalence and impact of NCDs Plan meetings to increase political buy-in High profile media figure to champion NCDs Lobby parliamentarians for new laws on alcohol and tobacco control 	x	x	x
Establish / advocate for legal framework for NCDs and its risk factors	Develop new NCD strategic plan in 2023, including review / situational analysis			x
	<u>TOBACCO- Support the implementation of FCTC</u>			
	Support multi-sectoral task force on tobacco control	x	x	x
	To fast track legislation and Support legislation of tobacco control	x	x	x

Strategy	Broad activity		Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
<i>(including reduction of presence of risk factors such as salt, sugar, alcohol and tobacco)</i>	regulations addressing tobacco use	Advocate for inclusion in the tobacco bill and other legislation / regulations of the following: <ul style="list-style-type: none"> • Increase excise and other taxes on tobacco products and if possible, return of revenue to NCD prevention/control • Plain/standardized packaging and/or large graphic health warnings on all tobacco packages • Comprehensive bans on tobacco advertising, promotion and sponsorship • Elimination of exposure to second-hand tobacco smoke in all workplaces, public places, public transport 	x	x	x
	Advocate for inclusion in legislation / regulations of the following: <ul style="list-style-type: none"> • Measures to minimize illicit trade in tobacco products • Ban cross-border advertising, including using modern means of communication 				x
	Monitor implementation of the legislation and regulations (DNCD&MH with the tobacco taskforce)		x	x	x
	<u>ALCOHOL</u>				
	Support multi-sectoral task force on alcohol control to: <ul style="list-style-type: none"> • Meet quarterly • Implement WHO global strategy to reduce harmful use of alcohol through multisectoral actions in the recommended target areas • Strengthen leadership and increase commitment and capacity to address the harmful use of alcohol • Carry out regular reviews of alcohol prices in relation to level of inflation and income and tax appropriately 		x	x	x
	Advocate for and contribute to the repeal of the Liquor Licensing (1960), Liquor (1924) and Palm Wine Acts (1927) and inclusion in new legislation and regulations of the following: <ul style="list-style-type: none"> • Increase of alcohol tax and if possible, return of revenue to NCD prevention/control • Bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media) including review of Media Code of Conduct • Restrictions on the physical availability of retailed alcohol (via reduced hours of sale, on-/and off-premise sales, restricted advertisement periods to after 10pm, banned sale close to schools, learning environments, motor parks, petrol stations and marketplaces) • Restrictions at specific events/spaces for children and young people such as sporting events, children's public spaces) 		x	x	x

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
	<ul style="list-style-type: none"> Minimum prices for alcohol where applicable Appropriate minimum age for purchase, sale or consumption of alcoholic beverages, reduce density of retail outlets, and empower retailers to demand proof of age (e.g. National ID card) Restriction or bans on promotions of alcoholic beverages in connection with sponsorships and activities targeting young people Appropriate restrictions and guidance on alcohol production, including informal production Ban or comprehensive restrictions of sachets that sets minimum standards and volumes of alcohol products Provision of consumer information about, and label, alcoholic beverages to indicate, the harm related to alcohol including the alcohol percentage 			
	Advocate for the review of the existing “driving under influence of alcohol” sections of the road traffic act (2007) to suit the current trend, e.g. to include sobriety checkpoints and provision of brief psychosocial intervention for persons with hazardous and harmful alcohol use.			x
	Advocate for integrating harm from alcohol in development programmes	x	x	x
	Advocate for /and contribute to workplace alcohol policy that also provides education on harm from alcohol			x
	Advocate for the development of systems for monitoring enforcement around alcohol marketing, production, sale, minimum age, etc. and for the coordination of non-health data on alcohol harm (Road Traffic Division of the Police, Family Support Unit (Police) - FSU, etc.)		x	x
	DIET			
	Advocate for the inclusion in legislation or regulations of the following: <ul style="list-style-type: none"> Reduce salt intake through the reformulation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals Reduce salt, sugar, fat intake through the implementation of front-of-pack labelling 	x	x	x
	Advocate for the inclusion in legislation or regulations of the following: <ul style="list-style-type: none"> Implementation of the WHO recommendations on the marketing of foods and non-alcoholic beverages to children Eliminate industrial trans-fats through the development of legislation to ban their use in the food chain Reduce sugar consumption through effective taxation on sugar-sweetened beverages 		x	x
	Advocate for subsidies to increase the intake of fruit and vegetables			x

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
	Advocate for inclusion in legislation or regulations of the following: <ul style="list-style-type: none"> Replace trans-fats and saturated fats with unsaturated fats through reformulation, labelling, fiscal policies or agricultural policies Implement nutrition labelling to reduce total energy intake (kcal), sugars, sodium and fats Limiting portion and package size to reduce energy intake and the risk of overweight/obesity 			x
	Advocate for adequate verification of food and beverages labelling.	x	x	x
	Advocate with stakeholders for whole-of-school program that includes quality physical education, availability of adequate facilities and programs to support physical activity for all children		x	x
	Advocate with stakeholders to provide convenient and safe access to quality public open space and adequate infrastructure to support walking and cycling		x	x
	Advocate with stakeholders to implement multi-component workplace physical activity programs		x	x

8.2 SO2: To mobilize sustainable funding for NCD activities at all levels

The table below contains the key strategies and broad activities under SO2. There is overlap between SO1, SO2 and SO5, please also consult SO1 and SO5.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Fundraising for NCDs both in / out of country (GoSL, local councils, in/out country donors)	Develop and regularly update NCD advocacy/briefing package/kit	x	x	x
	Establish and support a fundraising subgroup to the NCD TWG	x	x	x
	Develop and implement a fundraising plan	x	x	x
	Engage donors with the package/kit, including: <ul style="list-style-type: none"> Advocate for higher percentage of MoHS budget for NCDs (Ministry of Finance- MoF) 	x	x	x
	Review fundraising activities		x	x

8.3 SO3: To promote healthy lifestyles and reduce risk factors using health promotion strategies.

The table below contains the key strategies and broad activities under SO3.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Promotion of healthy lifestyles through IEC/BCC (Information, Education, Communication / Behaviour Change Communication)	Develop and regularly review NCD IEC/BCC strategy /health promotion guidance including <i>for example physical activity, harms of smoking/tobacco use and second-hand smoke, nature of problems caused by harmful use of alcohol and other substances (foetal alcohol spectrum disorders, drink driving etc.), healthy diets: reducing salt and sugar intake, promoting intake of fruits and vegetables, reducing total and saturated fats, exclusive breastfeeding for the first 6 months of life, lifestyle interventions to prevent type 2 diabetes, women not drinking alcohol or smoking during pregnancy, prevention of injuries (wearing helmet on motorbike, seat belt in vehicle etc.)</i>	x	x	x
	Produce and disseminate IEC/BCC materials on NCDs based on IEC/BCC strategy	x	x	x
	Raising public awareness of and educating the general public about modifiable NCD risk factors and the incidence, prevalence and impact of NCDs aiming at behaviour change (based on IEC/BCC strategy) using a mix of methods including for example: <i>Campaigns / Advocacy, High profile media figure to champion NCDs. + political statement, Civil society (e.g. Friends of Diabetes) to champion NCDs, Establishment and celebration of NCD days, Mass Media, Drama/Theatres (edutainment), Social mobilization - Community Engagement, Motivational and environmental programs, Nutrition education and counselling and mHealth for health promotion</i>	x	x	x
Focus on children, adolescents and young people	Develop and implement health promotion programs for addressing modifiable risk factors in primary, secondary and vocational schools, polytechnics and universities, using for example: <i>Disease / risk factor specific promotion messages, including warning for the dangers of alcohol, tobacco and drugs, "Tobacco free" schools, alcohol free school environments, Public Health Education in Schools, Drama/Theatres, Health Warning Labelling, Debate/Quiz Competition, School Sensitization on the harmful effects of tobacco, alcohol and substance abuse, Orientation of Peer Educators on the harmful effects of tobacco, alcohol and substance abuse, Orientation of Physical and Health Education Teachers and Guidance Counsellors on the harmful effects of tobacco, alcohol and substance abuse, Promotion of physical education in schools -e.g. dancing, competitive sports, Food demonstrations (what is healthy food, how to prepare healthy food), Education on healthy food choices, mHealth for health promotion.</i>		x	x
Provision of enabling environment for behaviour change towards healthy lifestyles	Promotion of physical activity through organized sport and physical recreation groups and clubs, programs and events e.g. walking, cycling, local games		x	x
	Reduce salt intake through encouraging the establishment of a supportive environment in public institutions such as hospitals, schools, workplaces and nursing homes, to enable lower sodium options to be provided		x	x
	Engagement of Food Handlers on the risks of high salt, sugar and "bad" fat intake			
	Support and enhance food demonstrations, nutrition education and counselling including food hygiene for example in communities, orphanages, correctional centres, foster homes, (pre)schools., workplaces, hospitals		x	x
	Support production and use of locally grown fruit and vegetables (<i>see also SO1</i>)		x	x

8.4 SO4: To strengthen NCD prevention, screening, diagnosis, management and care at all levels through implementation of practical, cost-effective and evidence-based interventions at all levels of care

The table below contains the key strategies and broad activities under SO4. Practical, cost-effective and evidence-based interventions will be prioritized at all service delivery levels, taking into account a life-course approach.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Training of health workers at all service delivery levels	Ensure adequate pre-service NCD training of health workers through regular curricula review, harmonization and adaptation for all relevant cadres	x	x	x
	Harmonize, further develop, coordinate and implement basic and refresher in-service NCD trainings for all relevant cadres (including preparation of a team of national trainers, and adaptation of national training materials, e.g. based on generic WHO-PEN training manual)	x	x	x
Strengthen NCD services at PHU and hospital level	Implement PEN-Plus at hospital level, ensuring NCD services are available at primary, secondary and tertiary / teaching hospital levels, including a two-way referral system	x	x	x
	Establish/ support NCD clinic days at district, regional and tertiary hospitals	x	x	x
	Implement NCD Desk guide at hospital and CHC levels (after guide has been finalized/updated, see below)	All hospitals, 5 CHC/district	Increase number (nr TBD- To be determined)	Increase number (nr TBD)
	Implement PEN at PHU level	5 CHC/district	Increase number (nr TBD)	Increase number (nr TBD)
	Establish and Strengthen early detection/screening		x	X
	Establish NCD follow-up systems for patients (e.g. NCD registers and inclusion NCD categories in existing registers and data tools)	x	x	X
	Advocate for / support integration of NCD information and counselling services into all preventive and curative health services	x	x	X
	Advocate for /support Drug therapy (including glycaemic control for diabetes mellitus and control of hypertension using a total risk approach) and counselling to individuals who have had a heart attack or stroke and to persons with high risk ($\geq 30\%$) of a fatal and non-fatal cardiovascular event in the next 10 years		x	x

	Support the roll out of vaccination against human papillomavirus (2 doses) of 9–14-year-old girls (together with DRCH)	x	x	x
	Support to establishment of cervical cancer screening of women aged 30–49 years (together with DRCH, Directorate of Hospitals)	x	x	x
	Advocate for/Support to hepatitis B birth dose immunization	x	x	x
	Establish specialised stroke care at hospital level (1x/district), starting with Connaught Hospital	x	x	x
	Establishment of physical rehabilitation centre units in all district hospitals, also catering for stroke rehabilitation		x	x
	Strengthen/establish palliative care: <ul style="list-style-type: none"> - Training of health care professionals in palliative care - Development of palliative care teams in district hospitals (next to the one in Connaught hospital) - Ongoing support and networking of palliative care teams to encourage a high standard of palliative care, patient follow up and further learning, via visits and update meetings, with reestablishment of a Sierra Leone Palliative Care Association. - Advocacy for availability of immediate release oral morphine in the public sector 	x	x	x
Establish and strengthen NCD community /family services and care	Scaling up community level management and care, including community level NCD screening and rehabilitation	x	x	x
	Promote family-based care for NCD patients	x	x	x
	Advocate for and support the involvement of CHWs in community level health promotion and mobilization for NCD clinic days and other NCD activities (<i>see also SO5</i>)	x	x	x
Establish guidelines / protocols for NCD prevention, screening diagnosis, management and care	Finalize and regularly update NCD desk guide ensuring inclusion of practical, cost-effective and evidence-based intervention (including printing, launch and dissemination, <i>see also SO1</i>)	x	x	x
	Develop, adopt and produce harmonized existing/new guidelines and protocols for management of NCDs at all levels of care, and train staff on their use (<i>see also SO1</i>)	x	x	x

8.5 SO5: To strengthen partnerships and establish a network of relevant stakeholders for surveillance, prevention, screening, diagnosis, management and care of NCDs.

The table below contains the key strategies and broad activities under SO5. There is overlap between SO1, SO2 and SO5, please also consult SO1 and SO2.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Establish national and district level coordination and partnership structures and support NCDI commission and its related TWGs and District NCD committees (<i>see also SO1</i>)	Support national multisectoral NCDI commission to: <ul style="list-style-type: none"> hold quarterly meetings (advocate for) implementation of all relevant global strategies including the global strategy on diet, physical activity and health 	x	x	x
	Support development and implementation of a multisectoral plan to address NCDs	x	x	x
	Establish and support national TWGs under the NCDI commission and hold monthly meetings	x	x	x
	Establish and support District NCD committees and hold monthly meetings	x	x	x
	Conduct stakeholder's orientation meetings on NCDs prevention and control	x	x	x
Ensure community level participation in all relevant NCD activities	Through the DPHC and DHMTs involve CHWs in community level health promotion and mobilization for NCD clinic days and other NCD activities (<i>see also SO4</i>)	x	x	x
	Engagement of community leaders and community members in NCD activities (including health promotion) through orientation of H/FMCs (Health and Facility Management Committees) and VDCs (Village Development Committees) on NCDs and their risk factors. <ul style="list-style-type: none"> Work with H/FMCs and VDCs on health promotion and establishing bylaws related to NCDs and their risk factors 		x	x
Participation of all relevant NCD implementers / stakeholders/ partners/ donors in coordination structures and partnership structures	Develop and regularly update NCD partners database (implementers, stakeholders, partners, donors)	x	x	x
	Encourage all partners to be part of the relevant coordination and partnership structures at national and/or district level	x	x	x
Alignment of all NCD implementers to NCD Directorate/ MoHS NCD guidelines / programs	Agree on NCD prevention and control programs at national and district level coordination structures (see also NCDI commission and its TWGs above)	x	x	x

8.6 SO6: To establish systems for monitoring and evaluation (including research and surveillance) to provide evidence for decision making and to assess effectiveness of promotion, prevention and control measures for NCDs at all levels of the healthcare system

The table below contains the key strategies and broad activities under SO6.

Strategy	Broad activity	Short term (1-2 years)	Medium term (3-5 years)	Long term (> 5 years)
Obtain data for action and advocacy	Conduct a STEPS survey	x		x
	Advocate to all national surveys to include NCDs Risk Factors and conditions	x	x	x
	Improve NCD inclusion in DHIS / HMIS through input on data tool reviews	x	x	x
	Quarterly extraction and analysis of NCD data from DHIS	x	x	x
	Publication of NCD newsletters and reports	x	x	x
Establish M&E system including surveillance	Develop, implement and regularly review NCD M&E and Surveillance Framework	x		x
	Annual review meetings to discuss amongst others the epidemiological trends of NCDs and their determinants, and the impact (health, socioeconomic etc.) of NCDs	x	x	x
	Provision of adequate logistics for M&E (vehicles for Directorate, motorbikes for NCD district focal persons etc.)	x		
	Integrate as much as possible into / with existing structures, for example at DPPI (HMIS, DHIS, ICT)	x	x	x
	Develop/adapt training modules on NCDs M&E and surveillance.		x	x
	Training of health care workers on NCDs M&E and surveillance		x	x
Support and expand existing cancer registry	Support Freetown cancer registry	x	x	x
	Establishment of population-based cancer registry in Western Area and regional headquarter towns		x	x
	Advocate for inclusion of cancer registry in DHIS 2.0		x	x
Establish NCD Research system	Advocacy meetings for investment in NCD epidemiological, behavioural and health system research	x	x	x
	Develop jointly with partners such as academic & research institutions a shared agenda for NCD research based on national priorities	x	x	x
	Support Annual meeting/forum to present NCD research and identify NCD research agenda, e.g. on the National NCD day.	x	x	x
	Ensure NCD Directorate is aware of all planned and ongoing NCD research (e.g. through SLESRC contact)	x	x	x
	Engage academia/ health worker training schools to interest final year students do NCD research		x	x
	Strengthen the knowledge base on the magnitude and nature of problems caused by harmful use of alcohol by operational research, improved monitoring and surveillance systems		x	x
	Conduct research of local relevance on tobacco and alcohol, tax policies, marketing, advertising and other restrictive strategies, harm to others including women and children, and impact of tobacco and alcohol interventions.		x	x

9 Indicative budget by Strategic Objective

The table below contains a summary of the indicative costing done for each strategic objective. Detailed costing will be provided in the detailed implementation plans. The total indicative cost for the 5 year strategy is United States Dollar (USD) 9,175,800. A separate Excel sheet is available with the details of the indicative costing.

Strategic Objective	Indicative cost in USD
Leadership & Governance	3,048,800
SO1 To reinforce leadership and strengthen capacity of the health system for prevention and control of NCDs	353,600
SO2 To mobilize sustainable funding for NCD activities at all levels	10,000
SO5 To strengthen partnerships and establish a network of relevant stakeholders for surveillance, prevention, screening, diagnosis, management and care of NCDs.	786,200
SO6 To establish systems for monitoring and evaluation (including research and surveillance) to provide evidence for decision making and to assess effectiveness of promotion, prevention and control measures for NCDs at all levels of the healthcare system	1,899,000
Health Promotion	1,716,000
SO3 To promote healthy lifestyles and reduce risk factors using health promotion strategies.	1,716,000
Services	4,441,000
SO4 To strengthen NCD prevention, screening, diagnosis, management and care at all levels through implementation of practical, cost-effective and evidence-based interventions at all levels of care	4,441,000
Total	9,205,800

10 Proposed M&E Framework

M&E will be implemented by the DNCD&MH together with its partners including the national NCDI commission and TWGs. Special elements of M&E include surveillance of NCDs and their risk factors – integrated in the existing HMIS – and research on NCDs and their risk factors to inform policy and planning.

The NCD Monitoring and Evaluation (M&E) framework will be further developed based on the current 5-year NCD strategic plan (2020-2024) and the detailed implementation plans.

The table below shows the proposed key indicators for the M&E strategic plan. Further details will be provided in the M&E framework, specifically in relation to the 3 separate implementation plans.

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
Impact	Impact 1. Premature NCD Mortality	Birth & Deaths registry	Annual	<i>Not available for now from registry (not detailed enough)</i>				
	Impact 2. Cancer incidence, by type	Population based cancer registry Or to start hospital based cancer registries	Annual	<i>Not available for now – National Cancer Registry only covers 18 health facilities</i>				
SO1 - Strengthening and capacity building of NCD Directorate at national and district level	1.1 % of Key NCD area national focal persons	DNCD&MH documents	Annual	0% (DNCD&MH, 2019)	50%	70%	85%	100%
	% of districts with focal persons	DNCD&MH documents	Annual	0% (DNCD&MH, 2019)	75%	85%	90%	100%
	1.2 % of the NCD Directorate capacity building plan that has been implemented	DNCD&MH documents	Annual	NA (no capacity building plan) (DNCD&MH, 2019)	50%	75%	90%	100%
SO1 - Sensitization/ Advocacy of all levels (Other sectors, MoHS)	1.3 Updated NCD advocacy/briefing package /kit	Updated NCD advocacy/ briefing package /kit	Annual	No	Yes	Yes	Yes	Yes
	1.4 Nr of advocacy meetings with other MoHS entities	DNCD&MH minutes of the advocacy meetings	Annual	assumed 0 (DNCD&MH, 2019)	2	4	4	4
	1.5 Nr of advocacy meetings with other line ministries	DNCD&MH minutes of the advocacy meetings	Annual	assumed 0 (DNCD&MH, 2019)	2	4	4	4
	1.6 Number of engaged politicians/ high profile people	DNCD&MH minutes of meetings and events	Annual	assumed 0 (DNCD&MH, 2019)	5	10	15	30
Establish / advocate for legal framework for NCDs and its risk factors (including reduction of presence of risk factors such as salt, sugar, alcohol and tobacco)	1.7 Tobacco bill enacted and implemented	Enacted Tobacco Bill, implementation documents	Annual	No	Yes	Yes	Yes	Yes
	1.8 Number of advocacy meetings for legislation for NCD risk factors (excluding tobacco)	DNCD&MH minutes of advocacy meetings (incl. relevant TWG and multi sector task force meeting)	Annual	DNCD&MH to provide for 2019	4	6	8	10
	1.9 National policies in place to limit of trans-fats in the food supply	WHO NCD Country Capacity Survey	Every 2 years	No (DNCD&MH, 2019)		No		Yes
	1.10 National policies in place to reduce the impact on children of the marketing of food and non-alcoholic beverages	WHO NCD Country Capacity Survey	Every 2 years	No (DNCD&MH, 2019)		Yes		Yes
SO2 - Fundraising for NCDs both in / out of country (GoSL, local councils, in/out country donors)	See advocacy pack indicator under SO1 above							
	2.1 Nr of meetings of the fundraising subgroup	Minutes of fundraising subgroup and of the overarching NCD TWG	Annual	0 (DNCD&MH, 2019) - no subgroup yet	4	4	4	4
	2.2 % of recurrent annual GoSL health (MoHS) recurrent budget allocated to NCD Directorate	Recurrent GoSL annual health (MoHS) budget	Annual	0.61%	1.0%	2.0%	3.0%	4.0%

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
	2.3 Nr of local councils (city/district) that have NCD activity budget line in their annual health budget	Local council health budgets (LGFD/ individual councils/DHMTs)	Annual	To be determined (TBD)	6	11	17	22
	2.4 Increased number of non-GoSL donors for NCD activities*	Partner database, documents related to funding including NHA and IATI	Annual	TBD (survey)	50% increase from baseline	80% increase from baseline	100% increase from baseline	200% increase from baseline
SO3 - Promotion of healthy lifestyles through IEC/BCC	3.1 Updated NCD message guide	Updated NCD message guide, documental evidence of update process.	Annual	No (DNCD&MH, 2019)	Yes	yes	Yes	yes
	3.2 Proportion of districts where at least 90% of PHU have posters and reading materials to promoted prevention of NCDs	ISSV database of results of checklist C1 (ISSV District to PHU cycle)	Bi-Annual	TBD (ISSV secretariat)	2	5	10	16
	3.3 Number of public awareness/ education activities	Public awareness/ education activities records	Annual, not cumulative	0 (regional meetings on tobacco in 2019) (DNCD&MH, 2019)	32 (2/district)	48 (3/district)	64 (4/district)	64 (4/district)
	3.4 Adult Per Capita Consumption of alcohol	Recorded alcohol use: 1. Government data: alcohol sales and alcohol production, import, export 2. FAOSTAT + Unrecorded alcohol use: survey data, FAOSTAT	Annual	TBD	TBD	TBD	TBD	TBD
	3.5 Prevalence of heavy episodic drinking	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.6 Prevalence of alcohol-related morbidity and mortality among adults and adolescents (10-19 years)	Population-based (preferably nationally representative) survey using validated instruments	At least every 5 years	TBD				TBD
	3.7 Prevalence of insufficiently physically active persons aged 18+ years	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.8 Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.9 Age-standardized prevalence of	Population-based (preferably	At least	TBD				TBD

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
	current tobacco use among persons aged 18+ years	nationally representative) survey	every 5 years					
	3.10 Age-standardized prevalence of raised blood pressure among persons aged 18+ years	Population-based (preferably nationally representative) survey in which blood pressure was measured, not self-reported.	At least every 5 years	TBD				TBD
	3.11 Age-standardized mean systolic blood pressure in persons aged 18+ years	Population-based (preferably nationally representative) survey in which blood pressure was measured, not self-reported.	At least every 5 years	TBD				TBD
	3.12 Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years or on medication for raised blood glucose	Population-based (preferably nationally representative) survey. (At least every 5 years	TBD				TBD
	3.13 Prevalence of overweight and obesity in adolescents (10-19 years)	School-based or population-based (preferably nationally representative) survey in which height and weight were measured.	At least every 5 years	TBD				TBD
	3.14 Age-standardized prevalence of overweight and obesity in persons aged 18+ years	Population-based (preferably nationally representative) survey in which height and weight were measured.	At least every 5 years	TBD				TBD
	3.15 Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.16 Age-standardized prevalence of persons aged 18+ years consuming less than five total servings (400 grams) of fruit and vegetables per day	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.17 Age-standardized prevalence of raised total cholesterol among persons aged 18+ years	Population-based (preferably nationally representative) survey in which cholesterol was measured, not self-reported.	At least every 5 years	TBD				TBD
	3.18 Age-standardized mean total cholesterol among persons aged 18+ years	Population-based (preferably nationally representative) survey in which cholesterol was measured, not	At least every 5 years	TBD				TBD

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
		self-reported.						
SO3 - Focus on children, adolescents and young people	3.19 Nr of new health promotion programs for children, adolescents and young people	Minutes and other evidence documents related to the (establishment and advocacy/support for) the new health promotion programs	Annual, not cumulative	assumed 0 (DNCD&MH, 2019)	5	10	20	20
	3.20 Prevalence of insufficiently physically active adolescents	School-based or population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
	3.21 Prevalence of current tobacco use among adolescents	School-based or population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
SO3 - Provision of enabling environment for behaviour change towards healthy lifestyles	3.22 Nr of new physical activity/ sports activities	Minutes and other evidence documents	Annual, not cumulative	assumed 0 (DNCD&MH, 2019)	10	20	40	80
	3.23 Nr of new public institutions with an encouraging environment for reduced salt intake	Minutes and other evidence documents	Annual, not cumulative	assumed 0 (DNCD&MH, 2019)	10	20	40	80
SO4- Training of health workers at all service delivery levels	4.1 Nr of pre-service students trained using the harmonized reviewed curricula	School records for nr of students trained, the harmonized reviewed curricula	Annual	0 (DNCD&MH, 2019)	TBD, Desk guide plans?	TBD	TBD	TBD
	4.2 Nr of in-service staff trained using the harmonized NCD training manual	Training records, the harmonized training manual(s)	Annual	0 (DNCD&MH, 2019)	TBD	TBD	TBD	TBD
SO4- Strengthen services and PHU and hospital levels	4.3 Nr of public hospitals with NCD clinic day(s)	Hospital records	Annual	2 (PIH Kono, Wednesday Connaught Diabetes - Friday Connaught Cancer)	10	20	40	54
	4.4 Nr of districts with at least 5 CHCs providing NCD services according to the Sierra Leone adapted WHO PEN package	Annual survey / implementation documents	Annual	0	2	5	10	16
	4.5 Nr of hospitals implementing Sierra Leone adapted WHO PEN-Plus package	Annual survey / implementation documents	Annual	0	2	5	10	16
	4.6 Proportion of eligible persons receiving drug therapy and counselling (including glycaemic control) to	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
	prevent heart attacks and strokes		(integrate into SARA if possible)					
	4.7 Percentage of public and private health care facilities who have available essential NCD medicines and basic technologies (<i>detail in definition</i>)	Nationally-representative health facility assessment (e.g. SARA)	At least every 5 years	TBD				TBD
	4.8 Access to palliative care assessed by oral morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per terminal diagnosis as identified by appropriately trained health care professionals.	Consumption of opioids (predominantly morphine) from International Narcotics Control Board (INCB) annual reports for narcotics consumption. Terminal illness from vital registration systems which record cancer and other terminal diseases with sufficient completeness to allow estimation.	Annual	For now, not able to calculate, but kept for future. <i>NB: current usage considered not true reflection of need based upon lack of accessibility</i>				
	4.9 Availability of vaccines against human papillomavirus	WHO-UNICEF Joint Reporting Form (JRF), DHIS 2.0 in future	Annual	TBD	TBD	TBD	TBD	TBD
	4.10 Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants	Surveys (DHS, MICS)	every 2-3 years	84.9% (MICS 2017)	TBD	TBD	TBD	TBD
	4.11 Proportion of women between the ages of 30–49 screened for cervical cancer at least once in the last 5 years	Population-based (preferably nationally representative) survey	At least every 5 years	TBD				TBD
SO4- Establish/strengthen NCD community / family services and care	4.12 Nr PEN-CHCs where surrounding communities / families are providing (support to) NCD management and care	Activity establishment records	Annual, not cumulative	0 (DNCD&MH, 2019)	10 (2 districts with 5 CHC each)	25 (5 districts with 5 CHC each)	50 (10 districts with 5 CHC each)	80 (16 districts with 5 CHC each)
SO4- Establish guidelines / protocols for NCD prevention,	4.13 % of NCD service sites with updated NCD guidelines /protocols for PHUs and Hospitals	Survey / Supervision records (e.g. SARA, ISSV)	Every 2-3 years (survey), Annual	No (DNCD&MH, 2019)	Yes, 5% sites with guideline	Yes, 20% sites with	Yes, 50% sites with	Yes, 95 % sites with guideli

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
screening, diagnosis, management and care			(ISSV)		es.... Depend s on desk guide distribut ion	guidelin es....	guidelin es....	nes....
SO5 - Establish national and district level coordination and partnership structures and support NCDI commission and its related TWGs and District NCD committees (see also SO1)	5.1 Nr of NCDI commission meetings	Meeting minutes and attendance lists	Annual	Established early 2019 – 3 (DNCD&MH, 2019)	4	4	4	4
	5.2 Nr of National TWG meetings	Meeting minutes and attendance lists	Annual	TBD (DNCD&MH, 2019)	4/year by type	4/year by type	4/year by type	4/year by type
	5.3 Nr of District NCD committee meetings in each of the 16 districts	Meeting minutes and attendance lists	Annual	TBD (DNCD&MH, 2019)	12/year in each district	12/year in each district	12/year in each district	12/yea r in each district
	5.4 Nr of stakeholder orientation meetings on NCD prevention and control	Meeting minutes and attendance lists of all district NCD committees	Annual	0 (DNCD&MH, 2019)	16 (1 per district)	16 (1 per district)	16 (1 per district)	16 (1 per district)
SO5 - Ensure community level participation in all relevant NCD activities	5.5 Number of community engagement activities at district level on NCDs	Community engagement records	Annual	2 (WA urban), (DNCD&MH)	32 (2/distri ct)	48 (3/distri ct)	64 (4/distri ct)	64 (4/distr ict)
SO5- Participation of all relevant NCD implementers / stakeholders/ partners/ donors in coordination and partnership structures	5.6 Presence of an actively updated database with all relevant NCD partners	Database itself, DNCD&MH documents that provide evidence most / all partners are included	Annual	No	Yes	Yes	Yes	Yes
SO5- Alignment of all NCD implementers to NCD Directorate/	5.7 Attendance of partners to harmonization / joint development meetings	Attendance lists and minutes	Annual	No	Yes	Yes	Yes	Yes

Level / Strategy	Indicator number & name	Data source(s)	Frequency	Baseline (data source, year)	Targets			
					2021	2022	2023	2024
MoHS NCD guidelines / programs								
SO6 - Obtain data for action and advocacy	6.1 Nr of STEPS surveys conducted in the last 12 months	Last STEPS survey report	Annual	0 (DNCD&MH, 2019)	1	0	0	1
	6.2 Nr of quarterly NCD data analysis reports	Quarterly data reports	Annual	0 (DNCD&MH, 2019)	4	4	4	4
SO6 - Establish M&E system including surveillance	6.3 Number of annual review meetings	Annual review meeting report	Annual	0 (DNCD&MH, 2019)	1	1	1	1
	6.4 Nr of districts that received national NCD supervision	Supervision records	Annual	0 (DNCD&MH, 2019)	16	16	16	16
	6.5 Nr of districts with 90% NCD health facility supervision	Supervision records	Annual	0 (DNCD&MH, 2019)	2	4	6	8
SO6 - Support and expand existing cancer registry	6.6 Nr of regions covered by cancer registry	Cancer registry records	Annual	1 (Cancer registry records, 2019)	2	3	4	5
	6.7 Inclusion of cancer registry in DHIS/HMIS	DHIS/ relevant entity records	Annual	No (DNCD&MH, 2019)	No	Yes	Yes	Yes
SO6 - Establish NCD Research system	6.8 Existence joint NCD research agenda based on national priorities	Updated research agenda	Annual	No (DNCD&MH, 2019)	No	Yes	Yes	Yes
	6.9 Number of Annual NCD research meetings	Research meeting minutes	Annual	0 (DNCD&MH, 2019)	1	1	1	1
	6.10 Number of NCD researches conducted	NCD research final reports	Annual	TBD (DNCD&MH, 2019)	2	3	4	4

Annex 1: Country Health System

The country health system is discussed in detail below.

Leadership and Governance

The Ministry of Health and Sanitation (MoHS) states on its website that it *“believes that access to sound health is a human right, its vision is to ensure a functional national health system delivering efficient, high quality health care services that are accessible, equitable and affordable for everybody in Sierra Leone and the overall goal is to maintain and improve the health of its citizens.”*¹⁰⁰

The MoHS is guided by several policy and strategy documents, including the recently developed Medium-Term National Development Plan¹⁰¹, the Health Policy¹⁰² and the National Health Sector Strategic Plan 2017-2021¹⁰³. A new health policy is in development as the current health policy is outdated (2002, revised in 2009). Service delivery is guided by the Basic Package of Essential Services 2015-2020 (BPEHS)¹⁰⁴ and the Free Health Care Initiative (FHCI).¹⁰⁵ The FHCI was launched in 2010 to provide free health care for children under 5 years and pregnant and lactating women.

Both the fiscal and human resources decentralization of the public health sector is incomplete. The MoHS staff is part of the overall government payroll, there is no separately managed MoHS payroll. Only recently Human Resources for Health officers were posted to district level. Tertiary health care (national level and regional referral hospitals) is not decentralized. Primary and secondary health care are decentralised and receive their Government of Sierra Leone (GoSL) funds through the local councils at district level. Coordination is limited between these city and district councils and the district hospitals that provide the secondary health care and the DHMTs that are responsible for primary health care through the Peripheral Health Units (PHUs). Also, at national level the coordination through the Health Sector Coordinating Committee and the Health Sector Steering Group is limited. Meetings are not very regular and serve often more as information sharing than real coordination. Coordination with other sectors is limited, with a few exceptions where a special entity has been created to improve coordination like the Scaling up Nutrition initiative and the Teenage Pregnancy secretariat.

Universal Health Coverage (UHC) links and cuts through all health-related SDGs. UHC is defined as the possibility for *“all people and communities to use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.”*

Sierra Leone is a signatory to the UHC2030 Global Compact which commits the country to support and accelerate progress towards UHC, through building and expanding equitable, resilient and sustainable health system.¹⁰⁶ WHO conducted a UHC scoping visit to Sierra Leone on UHC in June 2019, in which team members, among others, recommended to progressively expand the benefits package of FHCI to include all life cohorts.¹⁰⁷

Health service delivery

Sierra Leone's health system consist of three levels with community health workers (CHWs) and Peripheral Health Units (PHUs) at the primary level, district hospitals at the secondary level and regional and national / referral hospitals at the tertiary level. In 2017 there were 1284 public and private health facilities, including 54 hospitals in the country.¹⁰⁸

About 15,000 CHWs were trained in 2018. Their scope of work can be divided in 5 sections: General (community mapping and mobilization, referrals and quarterly routine home visits), RMNCH (Reproductive, Maternal Newborn and Child Health), iCCM Plus (integrated Community Case Management for under-fives Plus identification and treatment of malaria and diarrhoea in over-fives with anti-malarial medication and ORS respectively), Disease prevention and control (community based surveillance and reporting) and Community sensitization TB and HIV.¹⁰⁹

The highest level PHU – the Community Health Centre (CHC), usually found at the chiefdom headquarter town, usually supervises several middle and lower level PHUs - Community Health Post (CHP) and Mother and Child Health Post (MCHP) respectively. The cadre heading a facility – the PHU in charge – determines the level of the facility, usually a Community Health Officer (CHO) for a CHC, a Community Health Assistant (CHA) for a CHP and a Mother and Child Health Aide (MCHAide) for a MCHP.

In each district there is one (1) Comprehensive Emergency Obstetric and Neonatal Care Centre (C-EmONC) – at hospital level and five (5) Basic Emergency Obstetric and Neonatal Care Centre (B-EmONC) at CHC level. Midwives are based at hospitals and B-EmONC level and supervise maternal and neonatal health activities at the other PHUs. Medical doctors are only based at hospital level.

PHUs provide both preventive and curative services and are open either open 24 hours or have a staff on call for out of hours. MCHPs and CHPs only have observation beds, admission is only possible at CHC or hospital level.

A nationwide ambulance referral system called NEMS (National Emergency Medical Services) was set up by MoHS and its partners in 2018. This facilitates referrals from PHUs to hospital level.

The Service Delivery Indicators (SDI) are a set of key indicators that benchmark service delivery performance in the health and education sectors in Sub-Saharan Africa with as overarching objective to ascertain the quality of service delivery in basic health services and primary education. The 2018 SDI health survey for Sierra Leone¹¹⁰ sampled 547 health facilities in the country and found that Sierra Leone continues to lag far behind in maternal, infant and child mortality as compared to its regional peers. While it had better indicators on caseload (10.0 per provider per day), management of maternal and neonatal complications (31%), availability of drugs and infrastructure (56.0% and 47.7%) in the region, indicators on absence rate from facility (29.9% of health providers), diagnostic accuracy (44.5% of clinical cases), adherence to clinical guidelines (30.2%) and equipment (31.9%) availability were considered worse off.

A national Quality of Care program – under the Directorate of Reproductive and Child Health – and a national Quality of Care policy were established in 2018. This is expected to help solve the persistent quality of care problems including weak Infection prevention and control practices, diagnostic inaccuracy and case mismanagement.

Community participation and engagement are encouraged through involvement of facility or health management committees and village development committees in health activities and their planning and oversight. These committees are linked to the various PHUs. Similarly, each local council has a health management committee that is engaged in health planning and oversight.

Health system financing

Although there has been an increase of GoSL allocation to health in recent years, there is still a high out of pocket expenditure for health, estimated to be close to 70% of the total health expenditure (THET). The remaining parts of THET are by government (6%) and external sources (24%).^{111, 107}

There is very limited use of pre-payment schemes for health services, like health insurance. In the MICS 2017 survey the health insurance coverage was 2.4%, 2.1%, 1.8% and 3.9% for women and men 15-49 years, children aged 5-17 years and children under five respectively.⁷

The Sierra Leone Social Health Insurance (SLeSHI) act of 2017¹¹² contains the following exempted categories: children under 12 years; persons requiring antenatal care, child delivery and postnatal care; persons with mental disorder; persons classified as disabled; persons identified as indigent under the laws of Sierra Leone and Sierra Leoneans who have attained the age of 65. SLeSHI has not started so far. There is interest to start the system, there is a small office in the National Social Health Insurance Scheme (NASSIT) building, and the MoHS is working to develop an evaluation plan.¹¹³ A willingness-to-pay study for health insurance in the informal sector in 2016 showed that people would be willing to pay annually 20,237.16 SLL (3.6 USD) per adult (range 14,000 SLL (2.5 USD) to 35,000 SLL (6.2 USD)).¹¹⁴

Although the health financing working group at national was re-established in 2017, there is no current national health financing policy and strategy; although there are plans to develop these vital guidance documents.

Health budgets are made on annual basis at district level (part of council health budget for decentralised funds) and by tertiary hospitals, programs and directorates in the MoHS at national level. They usually only include the GoSL funding- i.e. there is no sector wide budgeting, with the resultant risks of funding gaps and duplications. Budget execution is limited with an estimated half of the budget actually reaching the requesting entities.

Funding for FHCI drugs is provided by DFID and the Government of Sierra Leone, with an increasing commitment for GoSL (10% 2018, 30% 2019 and 50% 2020). With these funds a selected priority set of FHCI drugs and supplies are procured, still leaving a funding gap of more than 50%. The cost-recovery system for drugs that was in place more than 10 years ago has not been revitalised, although there are plans to do so.

Human Resources for Health (HRH)

The Human Resources for Health (HRH) Directorate in the MoHS provides coordination and governance for human resources in the health sector, guided by the recently developed Human Resources for Health Policy and Strategy 2017-2021.^{115, 116}

GoSL employed 9,910 health workers in February 2016, of which 72% provided patient services. The majority work in one of the 1,323 MoHS workstations (hospitals, PHUs, clinics and administrative offices), with only few (1.4%) posted to private facilities or working at facilities governed by a public-private partnership (2.0%). It is estimated that in addition 9,120 unsalaried health workers were active in government health facilities in 2016, of which 40% - mostly lower-skilled cadres - provide patient services.¹¹⁷

The total health worker need according to the staffing norms in the BPEHS 2015 is 24,365 workers.¹¹⁷ Most cadre groups meet less than 50% of these staffing norms, with the exception of State Enrolled Community Health Nurses (SECHNs). The health worker density (per 10,000 population) ranges from 20.8 in Western Area Urban to 3.75 in Kailahun district, which is far below the 44.5 required – according WHO - for the SDGs and UHC.^{116, 118}

CHWs, Traditional Birth Attendants (TBAs) and traditional healers are not part of the Sierra Leone Civil Service.¹¹⁷ Up to 15,000 CHWs have recently been trained, for more detail under health service delivery below.

Next to a huge staffing gap, other HRH challenges include uneven distribution of existing health workers, limited coordination of pre- and in-service training, insufficient attention to regulation and limited availability and use of HRH data.

The new policy and strategy aim to address the main challenges through enhanced evidence-based decision making; improved HRH production; strengthening HRH governance, leadership and management; partnerships with stakeholders and resource mobilisation and advocacy.^{115,116}

Some progress was made during 2018, including ongoing recruitment of additional health workers, start of an attendance monitoring system with a related sanctions framework and posting of HRH officers and HRH assistants to each district.

Health infrastructure

The MoHS has provided standards and norms for equipment (in the BPEHS) and for infrastructure such as for WASH in health facilities¹¹⁹, however these are not in place for establishment, accreditation and management of health facilities.

The overall mean availability of tracer basic equipment at all 1284 health facilities in the country was 57% in 2017. Only 25% had all the items. The availability per individual tracer basic items was: 81% blood pressure apparatus, 92% stethoscope, 62% adult scale, 83% child scale, 87% thermometer and 58% light source.¹⁰⁸

Availability of equipment at 17 designated C-EmONC facilities was also limited: 42% oxygen, 53% resuscitation table (neonatal), 13% anaesthesia equipment and 21% incubator.¹⁰⁸

High-level diagnostic equipment (ultrasound machine, X-ray equipment, electrocardiography (ECG) machine and CT scan machine) availability has even more constraints. Pujehun district had all the equipment except for the ECG machine. Only two districts (Pujehun and Tonkolili) had a CT-scan machine. Four districts (Bonthe, Kailahun, Kambia, Moyamba) had none of the high-level diagnostic equipment.¹⁰⁸

The overall mean availability of tracer basic amenities at all 1284 health facilities in the country was 57% in 2017. Only 2% had all tracer items. The availability per individual tracer basic amenity was: 23% power (grid or generator), 57% improved water source, consultation room (with privacy) 71%, adequate sanitation facilities 84%, communication equipment 70%, access to computer with internet 4%, and emergency transportation 91%.¹⁰⁸

There is no planned preventive maintenance for physical infrastructure and medical equipment. There are only 2 biomechanical staffs in the MoHS at national level. There is at least one (1) solar technician in each district; taking care of the solar fridges for the vaccines cold chain.

Medicines and medical products and technologies

Provision and correct and safe use of medical products and technologies is guided by a whole range of documents including the National medicines policy¹²⁰, the Essential Medicines list¹²¹, the Standard Treatment Guidelines for Primary Level prescribers¹²², the National Formulary¹²³, National Health Laboratory Strategic Plan¹²⁴ and SOPs for integrated management of health commodities¹⁰⁷. Several of these documents are currently being reviewed and updated and/or revised. There are no policy documents for blood and blood products and for traditional medicines and products.¹⁰⁷

There is poor adherence to treatment guidelines.¹⁰⁷ Recently Drug and therapeutic committees have been established / revitalised in 8 hospitals, guided by the Drug & Therapeutic Committees operating manual.¹⁰⁷

National Medical Supplies Agency (NMSA) – currently in set up phase - is responsible for procurement, warehousing and distribution of drugs and medical supplies on behalf of all public institutions throughout Sierra Leone. The NMSA is new (enacted in 2017¹²⁵) and its preceding agency, the short-lived National Pharmaceutical Procurement Unit (NPPU) had limited procurement experience before it was disbanded in 2016.¹²⁶ DDMS (Directorate of Drugs and Medical Supplies of the MoHS) supported by partners like UNICEF continue to act in caretaker environment until NMSA can take up all its functions. The focus of supplies is for now on commodities for FHCI, RH/FP, nutrition and the 3 Global Fund diseases (TB, HIV, Malaria). There has been no functional national cost-recovery system for many years now.¹⁰⁷

There is a national supply chain Technical work group and several subgroups that develop procurement forecasts, plans and strategies for each set of commodities.¹⁰⁷

The SARA 2017 survey of all 1284 health facilities showed a low mean availability of the 24 essential medicine tracer items (31%), ranging from 24% in Tonkolili district to 37% in Bombali and Koinadugu districts, with none of the health facilities having all items available.¹⁰⁸

Health information systems

The Health Management Information System is guided by the National Health Sector Information Strategic Plan 2017-2021 and the e-Health strategy.

The key health information sources are national surveys such as DHS^{8, 208} and MICS^{7, 209} with as main sources for service utilisation data the DHIS 2.0 (District Health Information System), for HRH data the iHRIS (integrated Human Resource Information System) and for supply data the RRIV (Request, Report and Issue Voucher) forms.

MoHS Directorates and programs also collect data during supervision and special assessment visits.

PHUs report on paper to the DHMT, where the data are entered and are subsequently available online through the DHIS 2.0 at district and national level. Hospitals have in recent years been added to the DHIS 2.0 system, but still have data timeliness and completeness problems. Most PHU forms and the Integrated Disease Surveillance and Response (IDSR) for all health facilities has good (90-95%) data completeness and timelines. Every week an IDSR epidemiological bulletin is published. The IDSR forms and recently also the RRIV (Report, Request and Issue Voucher) and ISSV forms have been integrated into the DHIS 2.0.

The DHIS 2.0 system is currently hampered by lack of data tools combined with a delay in scaling up the digital data pilot, which would enable data entry at PHU level thus removing the cumbersome paper trail to district level. Other ongoing constraints are ICT hardware constraints, data quality and the limited use of the collected data for decision making, also due to limited data quality assurance and data analysis capacity and systems.

Supervision is done through Integrated Supportive Supervision (ISSV) combined with special focussed supervision by separate MoHS entities.

The last Health Sector Performance Review report (2016) was produced in 2017. Joint annual and mid-term reviews are irregular and could be strengthened.

Research for health is limited in the country, although an increase in research has been seen since the Ebola outbreak period, also due to limited research capacity in the country. There is no Research for health policy or strategy in Sierra Leone.

Annex 2: NCD status in Sierra Leone

General

Non-Communicable Diseases (NCDs) including injuries contributed to 41% of mortality in Sierra Leone in 2016 ¹²⁷, see Figure 8. It is estimated that there are 29,700 deaths every year in Sierra Leone because of NCDs, of which 14,000 males and 15,700 females. Sierra Leone is not on track to reach the 2025 global target (25% reduction of premature death from the 4 main NCDs) for females, see Figure 9. The 2016 premature death risk in Sierra Leone was 30% (male 28%, female 33%).^{127,128} It is estimated 9700 lives can be saved in Sierra Leone by 2025 by implementing all WHO “best buys”, which are cost-effective evidence-based NCD interventions which are further discussed in section 2.3.1. ³²

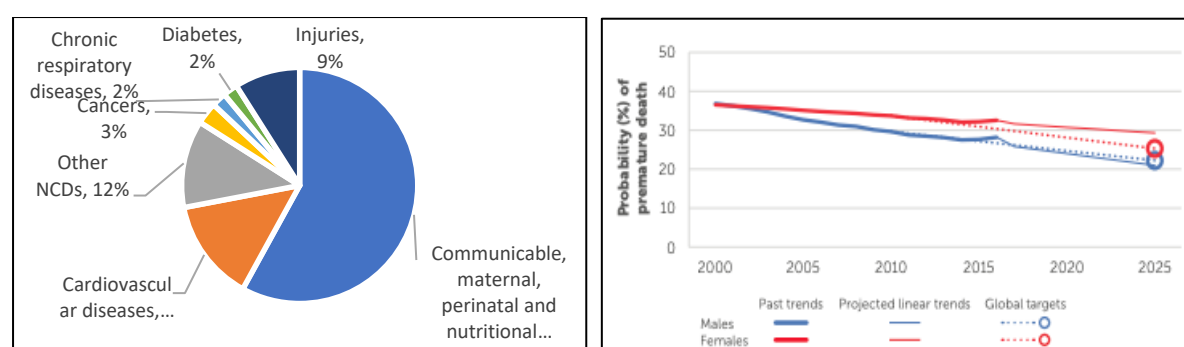


Figure 8: Estimated Sierra Leone Mortality contributions – 2016 Figure 9: Projected premature mortality trends against global voluntary mortality reduction targets, 2016-2025

In the top 10 causes of death for 2017 ischemic heart disease and stroke rank 4th and 6th respectively, showing a respective 17.0% and 16.7% increase in deaths from 2007. Ischemic heart disease ranks 10th in the top 10 of premature death causes, with a 17.6% increase of premature deaths from 2007. Six NCD conditions (headache disorders, low back pain, depressive disorders, diabetes, blindness and vision impairment and age-related hearing loss) are in the top 10 of disability causes. There are 7 NCD risk factors (air pollution, high blood pressure, dietary risks, alcohol use, tobacco, high fasting plasma blood glucose and high body mass index) out of the top-10 of risk factors for death and disability combined in Sierra Leone.

The MoHS DHIS 2.0 data for 2018 (see Table 4) ¹⁵³ show that at least 3.7% (n=181,645) of conditions presented to facilities that report to the DHIS are NCDs (PHU 2.8%, Hospital outpatient 19.0% and Hospital inpatient 13.4%). It should be noted that service delivery has limited focus on NCDs and in line with that the DHIS 2.0 data tools are not well-designed to capture all key NCDs and their risk factors and might be captured in a group with “other conditions”. Also, the data completeness of the hospital forms for 2018 is around 65%, however the PHU forms have a high completeness of over 98%.

Table 4: 2018 Morbidities in DHIS 2.0 by level and type*¹⁵³

Morbidity**	PHU (PHUF1)		Hospital Outpatient		Hospital Inpatient		Total	
	Number	%	Number	%	Number	%	Number	%
Communicable/ infectious diseases (incl. eye infection) ***	3,697,097	78.62	110,818	52.84	48,325	53.13	3,856,240	77.08
Nutrition (malnutrition, anaemia)	279,630	5.95	3,255	1.55	10,801	11.87	293,686	5.87
Neonatal	1,163	0.02	not in form	0.00	not in form	0.00	1,163	0.02
NCD – CVD	-	0.00	-	0.00	-	0.00	-	0.00
Cardiovascular diseases (Stroke/ Myocardial Infarction / Rheumatic heart disease/ congenital heart disease)	384	0.01	946	0.45	820	0.90	2,150	0.04
Hypertension	28,050	0.60	6,446	3.07	2,455	2.70	36,951	0.74
NCD – CRD	not in form	0.00	not in form	0.00	not in form	0.00		
NCD – Diabetes (Type 1 or Type 2)	399	0.01	1,025	0.49	505	0.56	1,929	0.04
NCD – Tumour/Cancer	371	0.01	367	0.17	182	0.20	920	0.02
NCD – Mental disorder	326	0.01	1,195	0.57	419	0.46	1,940	0.04
Injuries/accidents (Stings/Bites, Burns, Wounds/Trauma)	59,784	1.27	4,063	1.94	1,817	2.00	65,664	1.31
Other surgical (Acute abdomen, appendicitis, hernia, hydrocele)	3,489	0.07	4,563	2.18	4,446	4.89	12,498	0.25
Eye conditions (no eye infection) (cataract,	9,313	0.20	17,716	8.45	1,001	1.10	28,030	0.56

<i>glaucoma, refractive error, irreversible blindness / low vision, uveitis, diabetic retinopathy, eye trauma)</i>								
Ear, Nose, Throat conditions	3,541	0.08	1,274	0.61	387	0.43	5,202	0.10
Oral and dental conditions	2,235	0.05	2,296	1.09	162	0.18	4,693	0.09
NCD – others (PUD (Ulcer), Adverse Drug Reaction)	21,668	0.46	not in form	0.00	not in form	0.00	21,668	0.43
All NCDs	129,560	2.76	39,891	19.02	12,194	13.41	181,645	3.63
All other morbidities (mixed group, likely also some NCDs)	596,060	12.68	55,762	26.59	19,638	21.59	671,460	13.42
TOTAL	4,702,347	100.00	209,726	100.00	90,958	100.00	5,003,031	100.00
* Extraction date: 30 August 2019								
** Number of morbidities counted - NOT the number of patients								
*** Excluded "fever suspected malaria", only included confirmed malaria cases with treatment, assuming all malaria negative cases got assigned another morbidity								

Cardiovascular diseases (CVD)

Cardiovascular diseases (CVD) include conditions like heart attacks and stroke. CVD are responsible for 14% of the deaths in Sierra Leone.¹²⁷

In the top 10 causes of death for 2017 in Sierra Leone ischemic heart disease and stroke rank 4th and 6th respectively, showing a respective 17.0% and 16.7% increase in deaths from 2007. Ischemic heart disease ranks 10th in the top 10 of premature death causes, with a 17.6% increase of premature deaths from 2007.¹²⁹

The DHIS 2.0 - which counts morbidities at each visit so not unique patients - captured for 2018 in total 2,150 CVD morbidities amongst visits and admissions out of in total 5,003,031 morbidities (0.04%); 384 from primary health care and 946 and 820 from hospital out- and inpatient departments respectively.¹⁵³ It should be noted that differentiation between main and additional diagnosis is not possible in the DHIS 2.0. Hypertension, a CVD risk factor, is more frequent among the morbidities (0.74%) and will be discussed in detail in the risk factor section.

The 2017 Global Burden of Disease (GBD) study¹⁵¹ estimates 274,900 existing CVD cases in Sierra Leone (prevalence 3.7%¹⁵⁴), with 28,500 new cases every year. The most frequent are estimated to be rheumatic heart disease (23%), ischemic heart disease (23%), peripheral vascular disease (18%) and stroke (17%).

King's Sierra Leone Partnership together with the Connaught Hospital established a longitudinal prospective stroke register at the hospital on 8 April 2019. Early analysis of pilot data from the register shows no sex difference (50% women) and a median age of 60 for first stroke. There is a high proportion of haemorrhagic strokes (35%) which is higher than the sub-region and many High-Income countries. Hypertension is the dominant risk factor, present in 95% of the cases. Cases moved from an average Barthel index pre stroke score of 100 (fully independent) to an average Barthel index post stroke score of 10 (very disabled), with the average National Institute of Health Stroke Severity Score being 15 (severe). The hospital mortality is high (33%) and at 3 months follow-up mortality is 53%. In summary this means that in Sierra Leone – in comparison with the sub-region and in High-Income countries – younger previously fully independent and healthy individuals are having more severe strokes that cause significant death and disability.¹³⁰

Risk factors for CVD include tobacco use, unhealthy diet, obesity, physical inactivity, harmful use of alcohol, hypertension, diabetes and hyperlipidaemia.¹³¹ In rheumatic heart disease the heart muscle and valves are damaged by rheumatic fever, caused by an infection with streptococcal bacteria. These bacteria are a common cause of throat infections during childhood. The other risk factors will be discussed in the respective disease and risk factor sections below.

Cancers

As mentioned above, cancers are responsible for 3% of the deaths in Sierra Leone.¹²⁷ Cancer incidence and prevalence information is limited, the cancer registry is collecting information from 18 health facilities in the Western Area, most of them located in the urban part. The Global Cancer Observatory estimated that there were 4,125 new cases of cancer in Sierra Leone in 2018 (M 1,625; F 2,500). In 2018 there were an estimated 5,984 (M 2,123; F 3,861) people alive who were diagnosed with cancer in the last 5 years (5-year prevalence). The estimated number cancer deaths in 2018 was 3,002 (M 1,265; F 1,737). The risk of developing and dying of cancer before the age of 75 years is respectively 10.6% (M 9.6%; F 11.5%) and 8.4% (M 7.8%; F 8.9%). The most frequent cancers in Sierra Leone are breast, liver, prostate, cervix and colorectum cancers. For women the most frequent cancers are breast, cervix, liver, colorectum and stomach cancers. For men the most frequent cancers are prostate, liver, stomach, colorectum and Non-Hodgkin lymphoma cancer.¹³² Whilst cancers in children are generally rarer there remain significant numbers of cases with key identifiable tumours including Burkitt's Lymphoma, Retinoblastoma and Wilms' (nephroblastoma).¹³³

The Connaught Palliative Care Unit (CPCU) saw 168 patients in its first 15 months of action, 95% for cancer.¹³⁴ The most common conditions among adult (>18 years) palliative patients were breast cancer and hepatocellular cancer, followed by abdominal (including ovarian) and cervical cancer. The most common conditions among paediatric palliative patients were Burkitt's lymphoma and retinoblastoma, followed by Wilms' nephroblastoma and rhabdomyosarcoma.

920 visits and admissions of patients with tumours or cancers were reported to the DHIS 2.0 in 2018 of which 41% in the Western Area (urban + rural), with an average of 66 per district (range 1-209).¹⁵³

The Western Area cancer registry data¹³⁵ show a gradual annual increase of cases from 2015 to 2017 (267, 330, 442) with an annual average of 346, which is less than 10% of the estimated annual cases. 94% of the 2015-2017 cases are reported from urban health facilities. More than 80% of the annual cases for 2016 and 2017 for males are due to liver and prostate cancer and for women are due to breast and cervix cancer.

The preliminary analysis for 2018 shows a similar picture, although with a higher annual figure (1,529) due to an increase of the reporting facilities from 12 to 18, with for women most common are breast (75.6%) and cervix (22.0%) cancer and for men prostate (56%), liver (15%) and eye (14%) cancer. Total cases for 2015-2018 are 2,568 of which 1,510 females and 1,058 males. The 2018 figure is still only a bit more than one third of the annual new cases.

Two historical studies report 0.08% (20 out of 22,543) admission cases with 'malignant new growths' from 1870-1900 and 30 cases for 1900-1910 with 10 in the last year (1910).^{136, 137} One surgical survey¹³⁸ found a breast mass prevalence of 3.3% among 3,645 persons from 1,843 households in Sierra Leone in 2012, mostly in women, with 49.1% in women over 30 years.

A recent NCD study¹³⁹ in selected health facilities in the Western Area (in 27 PHUs, 5 secondary hospitals and 1 tertiary hospital for internal medicine) using the DHIS 2.0 found 82 (44% female) tumour/cancer cases in the pre-Ebola period (Jun13-Apr14) and 45 cases (87% female) during the Ebola outbreak (Jun14-Apr15). The majority were reported from tertiary health care level (91%).

Cancer risk factors include tobacco, physical inactivity, dietary factors, obesity and overweight, alcohol use, infections, environmental pollution, occupational carcinogens and radiation.

Infectious agents such as helicobacter pylori, human papilloma virus (HPV), hepatitis B and C and Epstein-Barr virus are related to almost all of the most frequent cancers in Sierra Leone: stomach cancer, cervix cancer, liver cancer and Non-Hodgkin lymphoma.¹⁴⁰ There is no national prevalence information on these infectious agents, however several scientific studies of sub-populations show that there is a considerable prevalence of at least Hepatitis B and C in Sierra Leone, contributing to the cancer case load. No prevalence information was found on helicobacter pylori and HPV prevalence, while only one study reported on Epstein-Barr virus.

A study of 16,807 blood samples (80% male) from 5 blood bank laboratories across the country in the year 2016 showed 9.7% Hepatitis B and 1.0% hepatitis C prevalence. There was a higher prevalence among samples from rural blood banks, especially for Hepatitis C. Family replacement donors had a higher prevalence of Hepatitis B and C than voluntary donors.¹⁴¹ Similar results were found in a 2016 blood donor study in up-country Masanga hospital: Hepatitis B 15% in men and 13% in women and Hepatitis C in 8% of men and 7% of women.¹⁴² Chronic Hepatitis B (HBsAg positive) prevalence was 8.7% and 10.0% among 447 and 221 health care workers respectively in 2017.¹⁴³ A recent study of 96 patients with an unexplained yellow-fever negative febrile jaundice found Hepatitis B virus, Hepatitis C virus and Epstein-Barr virus in respectively 1.04%, 34.38% and 55.21% of the cases.¹⁴⁴ A study of 211 HIV-positive patients aged ≥ 18 years in Freetown in 2017 found 21.7% hepatitis B surface antigen (HBsAg) and 4.3% anti-HCV.¹⁴⁵

Earlier studies showed a seroprevalence of HBsAg of 13.7% (2012-2013, Bo, 860 febrile patients)¹⁴⁶, 6.2% (2005, Freetown, 302 middle/high socio-economic class pregnant women attending antenatal care, Freetown)¹⁴⁷, 16.7% (1998, Freetown, 66 primary school children)¹⁴⁸ and 11.3% (1997, rural/semi-urban, 179 pregnant women attending antenatal care)¹⁴⁹. The primary school children survey also found 2% Hepatitis C virus antibody prevalence.

Chronic respiratory diseases (CRD)

The most common chronic respiratory diseases (CRD) are chronic obstructive pulmonary disease (COPD), asthma, respiratory allergies, occupational lung diseases and pulmonary hypertension. CRD are responsible for 2% of the deaths in Sierra Leone.¹²⁷ No incidence or prevalence information was found for asthma, COPD or other CRD in Sierra Leone, likely also due to the absence of any form of CRD in the DHIS 2.0 PHU and hospital forms.¹⁵⁰

The 2017 Global Burden of Disease (GBD) study estimates 383,200 existing CRD cases in Sierra Leone, with 65,100 new cases every year. The vast majority are either COPD (140,800 existing, 9,100 new) or asthma (253,100 existing, 55,800 new) cases. More than 97% of the COPD cases are not combined with heart failure. About 63% of the existing and new asthma cases are estimated to be symptomatic.¹⁵¹

Main risk factors for CRD include tobacco smoking, indoor air pollution, outdoor pollution, allergens, occupational risks and vulnerability and frequent lower respiratory tract infections during childhood.^{150, 152} Most risk factors are discussed in further detail below.

Diabetes

Diabetes is responsible for 2% of the deaths in Sierra Leone.¹²⁷ The DHIS 2.0 - which counts morbidities at each visit so not unique patients - captured for 2018 in total 1,929 visits and admissions of people with diabetes out of in total 5,003,031 morbidities (0.04%), of which 399 from primary health care and 1025 and 505 from hospital out- and inpatient departments respectively.¹⁵³ Differentiation between main and additional diagnosis or differentiation between diabetes type 1 and 2 is not possible in the DHIS 2.0.

The 2017 Global Burden of Disease (GBD) study estimates that there are 249,800 existing diabetes cases in Sierra Leone – a population prevalence of 3.3%; with 15,000 new cases every year, of which > 95% type 2.^{151,154}

The earliest diabetes prevalence study, published in 1997, found a prevalence of 0.0% among 256 rural and of 2.4% among 245 urban adults in Bo District using random blood glucose concentration.¹⁵⁵

A study in Bo Government Hospital from 2012-2014 among 694 adult outpatients using fasting blood glucose level found a prevalence of 6.2% (M 5.2%, F 7.4%). Prevalence increased with age up to 25% for ages 60 and older. The standardized prevalence of diabetes was 7.0% after adjustment to the age and sex distribution of the national population.¹⁵⁶

Analysis of a recent CVD risk factor study in Bo District¹⁵⁷ in 2071 adults aged over 40 years found a prevalence rate of 3.5, with more diabetes in urban respondents and respondents from higher wealth quintiles, especially in the wealthiest quintile. There was significantly more diabetes in females and an increasing risk with increasing age in the multivariate analysis using population weights.

Risk factors for diabetes include unhealthy diet (sugars, unsaturated fats), physical activity and being overweight/obese.¹⁵⁸ They will be discussed under risk factors below.

Mental and substance use disorders

The DHIS 2.0 - which counts morbidities at each visit so not unique patients - captured for 2018 in total 1,940 visits and admissions of people with mental disorder out of in total 5,003,031 morbidities (0.04%), of which 326 from primary health care and 1195 and 419 from hospital out- and inpatient departments respectively.¹⁵³ Differentiation between main and additional diagnosis or differentiation between mental disorder types is not possible in the DHIS 2.0. The DHIS 2.0 does not have a separate category for substance-use disorders at the moment.

A 2002 MoHS needs assessment at the end of the civil war reported prevalence rates of 2 percent for psychosis, 4 percent for severe depression, 4 percent for severe substance abuse, 1 percent for mental disability and 1 percent for epilepsy.¹⁵⁹

The 2016 WHO NCD country profile for Sierra Leone estimates a suicide mortality rate of 9.7 per 100,000.¹²⁷

The 2017 Global Burden of Disease (GBD) study estimates that there are 832,000 people with an existing mental disorder in Sierra Leone (prevalence 11.1%), with 319,300 new disorders every year. The most common mental disorders are depressive disorders and anxiety disorders.

The GBD study estimates 97,000 people (prevalence 1.3%) with an existing substance-use disorder, with 39,900 new disorders every year – mostly due to alcohol, opioid or cannabis use.^{151,154}

Injuries

Injuries are responsible for 9% of the deaths in Sierra Leone.¹²⁷ The 2017 Global Burden of Disease (GBD) study¹⁵¹ estimates that there are 972,600 people with an existing injury in Sierra Leone (prevalence 13.0%¹⁵⁴), with 370,700 new injuries every year. The most frequent injury categories are unintentional injuries, like falls and self-harm and interpersonal violence, each about 45 %. Transport injuries are estimated to contribute about 10%.¹⁵¹

In 2013, 51% and 33% of ever-married 15-49 year women and men had experienced any form (emotional, physical, sexual) of intimate partner violence, with 33.9% of women and 26.0% in the experiencing it in the previous 12 months. Physical violence by intimate partners occurred among 27.2% of the women and 15.1% of the men.⁸ Violent discipline is common in Sierra Leone, with 86.5% of children age 1-14 years experiencing any physical punishment and/or psychological aggression by caregivers in the past one month.⁷ The DHS 2013 showed that women whose husbands are often drunk were more likely to experience emotional, physical, or sexual violence (67%) as compared to women whose husbands do not drink alcohol (48%).⁸

The DHIS 2.0 - which counts morbidities at each visit so not unique patients - captured for 2018 in total 65,664 visits and admissions of people with injuries (including Stings/Bites, Burns, Wounds/Trauma) out of in total 5,003,031 morbidities (1.31%), of which 59,784 from primary health care and 4,063 and 1,817 from hospital out- and inpatient departments respectively. Differentiation between main and additional diagnosis is not possible in the DHIS 2.0.

A 2012 nationwide survey¹⁶⁰ among 1,843 households showed that 23.95% 3,645 respondents had at least one lifetime traumatic injury, while 12.4% had at least one traumatic injury in the preceding year. There were significantly more injuries in the preceding year among men, and among children (as compared to elderly). There were no significant differences by residency, occupation or education level. The most common lifetime injuries were falls (urban 41%, rural 44%), stab/slash/cut/crush (urban 27%, rural 31%) and burns (urban 15%, rural 10%). Traffic injuries contributed 13% of urban and 9% of rural injuries. The least common injury causes were bite or animal attack (urban 2%, rural 3%) and gunshot wounds (urban 1%, rural 2%). The most commonly affected body regions were the extremities (55%) and head and neck (16%). The leading cause of injury related deaths were transport injuries, although they are only the 4th most common cause of injuries. 3.98% had at least one burn injury, with higher frequency especially among younger children (0-4 years 5.4%, 5-14 years 4.17%). 89% of burns were due to a hot liquid or object.¹⁶¹

A total of 340 injury patients presented during a 3-month observational study to the Emergency Centre of the tertiary Connaught hospital in Freetown in 2016.¹⁶² These patients are 11.6% of the total emergency centre attendees and account for 68% of the adult surgical admissions. The mean age of the injury patients was 26 years, and 66% of them were male. The most common conditions were road traffic accidents (55%), falls (17%) and assaults (14%). Burns were more common in children (16%). Head (39%) and lower extremities (21%) were most commonly injured body areas – similar to the 2012 study.¹⁶⁰

Other NCD conditions

Beyond the 5 conditions of the 5x5 agenda and injuries there are several other NCD conditions of relevance for Sierra Leone. They are summarized in Table 5 below, with detail on subcategories in the last column. There are an estimated 3,510,000 existing cases of hemoglobinopathies and haemolytic anaemias in Sierra Leone in 2017 – a prevalence of 46.8%; with 145,000 new cases every year. The majority has either sickle cell trait (2,103,400 existing, 72,300 new), G6PD (Glucose-6-phosphate dehydrogenase) deficiency trait (1,231,200 existing, 41,100 new) or G6PD deficiency (556,900 existing, 19,400 new). Less common are Sickle cell disorders (47,700 existing, 8,000 new) and thalassaemia trait (120,700 existing, 4,200 new).

Table 5: Other NCD conditions: prevalence and incidence, 2017, Sierra Leone

Other condition categories	NCD	2017 Prevalence - existing cases	2017 Incidence – new cases per year	Prevalence % *	Details on existing cases (as % of the total category) **
Neurological disorders		3,049,800	1,030,700	40.7%	99% headache disorders
Digestive diseases		2,207,700	404,500	29.4%	85% cirrhosis and other chronic liver diseases
Skin and subcutaneous diseases		2,089,000	4,765,000	27.9%	16% dermatitis, 53% fungal skin diseases, 7% viral skin diseases
Sense organ diseases		1,413,800	Not available	18.9%	63% Blindness and 53% vision impairment & age related and other hearing
Musculoskeletal disorders		724,500	250,600	9.7%	62 % low back pain and 22% neck pain
Kidney diseases		510,400	19,900	6.8%	Mainly chronic kidney diseases, only 0.02% for acute glomerulonephritis
Other NCDs		5,942,300	4,297,000	79.2%	2% congenital anomalies, 2% urinary diseases and male infertility, 11% gynaecological diseases, 59% hemoglobinopathies and haemolytic anaemias, 2% endocrine, metabolic, blood and immune disorders and 68% oral disorders
					<i>Hemoglobinopathies and haemolytic anaemias: 46.8%</i>
*based on projected population for 2017 - using the medium variant option of 7,499,486 ^{1,154}					
**percentages do not tally to 100% because people can have more than 1 NCD condition					

The NGO Sierra Leone Sickle Cell Society (SLSCS)¹⁶³ estimates the frequency of the sickle gen in Sierra Leone at about 20-25%. It is estimated that approximately 1.5% of births have a clinically significant sickle cell disorder (Sickle cell types SS or

SC, or S-Beta thalassemia). The SLSCS has over 2500 sickle cell disease patients on its register, with more than 4500 attendances to their services in 2018.

People living with Disabilities (PWD)

Disability prevalence ranges from 1.3% (Census 2015¹⁶⁴) and 2.4% (Census 2004¹⁶⁵) to 9.2% (MICS 2017)⁷, with differences possibly due to different measurement methods. Other estimates based on limited evidence suggest prevalence rates of 7-10% with some as high as 24%^{166, 167, 168, 169}. The Census 2015 found more disability in Northern and Eastern Regions. 67% of PWD live in rural area.¹⁶⁴ The MICS 2017 found the highest disability proportions in young adolescents. 19% of children age 2-17 years had a functional difficulty in at least one domain.⁷ The most common types of disability in 2015 were physical disability caused by polio (21.8%) and partial sightedness (15.2%).¹⁶⁴ The most common causes of disability in the 2015 census were diseases or illnesses (40.5%) or congenital (16.2%).¹⁶⁴

The estimated main causes of years lived with disability (YLD) in Sierra Leone for 2017 were dietary iron deficiency, headache disorders, low back pain, depressive disorders and onchocerciasis.¹⁷⁰ 60% of disability-adjusted life years (DALYs) in Sierra Leone is a result of communicable disease.^{171, 172} It has been estimated that 30% of disability in Sierra Leone is related to mental illness.¹⁷³

Six NCD conditions are in the top 10 of disability causes, with several of them showing considerable estimated increases from 2007, see Table 6.¹²⁹

Table 6: Health problems that cause the most disability, Sierra Leone 2017 (adapted from IHME ¹²⁹)

2017 ranking	% change 2007 – 2017
1. Dietary iron deficiency	45.2%
2. Headache disorders	42.3%
3. Low back pain	42.6%
4. Depressive disorders	41.0%
5. Onchocerciasis	19.3%
6. Vitamin A deficiency	-7.5%
7. Diabetes	46.8%
8. Malaria	-8.2%
9. Blindness and vision impairment	27.2%
10. Age-related hearing loss	37.9%

The main impairments according to their estimated population prevalence based on the 2017 GBD study are anaemia (53%), vision loss (14%) and hearing loss (12%). Some less frequent impairments are infertility (2.2%), developmental intellectual disability (2.1%) and epilepsy (0.9%).^{151,154}

Annex 3: NCD Risk Factors in Sierra Leone

There are 7 NCD risk factors out of the top-10 of risk factors for death and disability (Disability Adjusted Life Years = DALYs) combined in Sierra Leone, see Table 7. This also shows the % increases (or decrease) from 2007. Several NCD risk factors increased since 2007, especially high blood pressure, high fasting plasma glucose and high body mass index.¹²⁹

Table 7: Risk factors for death and disability (DALY) combined, Sierra Leone 2017 – NCD risk factors in bold (adapted from IHME ¹²⁹)

2017 ranking	% change 2007 – 2017
11. Malnutrition	-21.1%
12. WaSH	-20.7%
13. Air pollution	-20.0%
14. High blood pressure	18.8%
15. Dietary risks	19.4%
16. Alcohol use	-4.7%
17. Unsafe sex	-6.3%
18. Tobacco	-3.0%
19. High fasting plasma glucose	27.4%
20. High body mass index	62.1%

Risk factors: Modifiable behaviours and metabolic risks

Key NCD Risk factors consist of both modifiable behaviours and metabolic risks. Key modifiable behaviours include tobacco use, physical inactivity, harmful use of alcohol, unhealthy diets and air pollution. Key metabolic risk factors include raised or elevated blood pressure (hypertension), overweight/obesity, hyperglycaemia and hyperlipidaemia. In each key risk factor sub-section relevant data from the STEPS survey^{174, 175}, other national surveys and other sources are mentioned.

Other NCD risk factors include socio-economic, cultural and other factors including life-style related factors, biological and chemical hazards, physical and built environments including dangerous work places, unplanned urbanization, limited regulation of tobacco, food and beverage industries, unregulated driving under the influence of alcohol and drugs, use of mobile phones when driving and poor road conditions and network.

Tobacco use

The current smoking rate in the STEPS 2009 survey ^{174, 175} among 25-64 year adults was 25.8% (M 43.1%, F 10.5%), with 22.5% (M 39.5%, F 7.5%) smoking tobacco daily. The average age when smokers started smoking was 21.4 years (M 21.1, F 23.0). The majority (92.4% - M 91.7%, F 95.7%) smoked manufactured cigarettes, an average number of 7.2 (M7.6, F5.6) cigarettes per day.

The last DHS surveys ^{8, 208} shows a decrease from 2008 to 2013 over the years of tobacco smoking in both men (cigarettes 36.6% to 26%; pipe 0.4% to 0.2%) and women (cigarettes 6.0% to 4.0%; pipe 0.2% to 0.1%), with also a decrease in smokeless tobacco use (M 3.9% to 1.4%; F 5.5% to 4.0%). Use among pregnant women is similar to use among non-pregnant women. Overall tobacco use is higher in older respondents, rural areas, up-country regions, lower education and wealth groups. Cigarette smoking has a wide variety among districts (range M 8.4-40.7%; F 1.4-10.5%). Heavy smoking (more than 10 cigarettes in the last 24 hours) among males increased from 39.0% in 2008 to 53.9% in 2013.

In the MICS 2017 ⁷ 7.2% of women and 23.4% of men (15-49 years) indicated they ever used tobacco, with 4.1% and 16.6% respectively using tobacco in the last month. Only 0.3% of women and 1.8% of men smoked a whole cigarette before they were 15 years old.

Tobacco use and smoking in men and women is more common in rural areas, Eastern/Southern region, specific districts (F: Pujehun, Kailahun and M: Kailahun, Kenema, Bo, Bonthe, Pujehun, Kambia), in higher ages groups (F: above 30-35 years and M: above 25-29 years), in lower education groups, among people living with a functional difficulty and in poorer wealth quintiles.

The number of cigarettes in the last 24 hours was higher for men than for women (<5 cigarettes F 56.9% - M:25.8%; 5-9 cigarettes F 27.7% - M 33.2%; 10-19 cigarettes F13.7% - M 35.1%; 20+ cigarettes F 1.7% - M 6.0%). ⁷

Analysis of the recent Bo District CVD risk factor study ¹⁵⁷ in 2071 adults over 40 years of age found that 25% of the respondents were current smokers, with significantly more smokers among urban residents, males, younger ages, those with less education and those in poorer wealth quintiles in the multivariate analysis using population weights.

The Investment Case for tobacco control in Sierra Leone estimates that 3,330 deaths per year in Sierra Leone are attributable to tobacco.¹⁷⁶ Thus 1.5% of GDP is lost every year due to tobacco-related illnesses. For example, in 2017 SLL 404 billion was lost due to tobacco use, of which 73% from economic productivity losses. A package of 6 priority FCTC

interventions is proposed in the investment case: raising cigarette taxes, protecting people from tobacco smoke, warning labels, plain packaging, mass media campaigns and bans on advertising. Implementing these 6 interventions can avert 19,900 deaths over 15 years and subsequently avoid SLL 1.9 billion economic losses. It is estimated that for every Sierra Leone Leone (SLL) invested in the 6 interventions now, Sierra Leone will receive SLL 26 by 2033, a 26:1 return on investment over 15 years of stronger tobacco control.

Physical inactivity

The 16.4% (M13.8%, F 18.9%) of the 25-64 adult respondents of the 2009 STEPS survey ¹⁷⁴ had low levels of activity (defined as < 600 MET-minutes per week). ¹⁷⁷ The average time per day that respondents spent on physical activity was 248.6 minutes (M 300.0, F 214.9). At most one third of the respondents (31.0% - M 21.7% vs F 39.8%) did not engage in vigorous activity.

Preliminary analysis of the recent Bo District CVD risk factor study ¹⁵⁷ among 2071 over 40 year adults showed a mean Moderate to Vigorous Physical Activities (MVPA) of 4.5 hours per day and a mean of 3.15 sedentary hours per day. Over 90% of participants met the WHO recommendations of > 150 minutes MVPA per week. ¹⁷⁸ MVPA appears to be less in urban respondents, in female respondents, in older respondents and in higher wealth quintiles.

Harmful use of alcohol

The STEPS 2009 survey among 25-64 adults found that 17.2% of the respondents are current drinkers (i.e. drank alcohol in the past 30 days) with a clear difference between males and females (24.4% versus 10.9%). The percentage who engage in heavy episodic drinking (i.e. male 5 or female 4 or more drinks on any day in the past 30 days) was also higher from men (14.3%) than for women (5.2%). 68.1% of respondents (M 59.4%, F75.7%) are lifetime abstainers, while 10.2% (M 11.6%, F 9.1%) are past 12 month abstainers. ¹⁷⁴

Early alcohol use was low in the MICS 2017 ⁷ with only 0.4% of the women and 3.1% of the women aged 15-49 years who had at least one alcoholic drink before age 15. Current alcohol use was higher with 2.0% of the women and 11.3% of the men taking at least one alcoholic drink in the last month. There was no urban-rural difference for current alcohol use, but there was more alcohol use in Kailahun and Bo districts and above 30 years of age.

Harmful use of alcohol causes or contributes to alcohol use disorders, suicides, interpersonal violence, traffic injuries, epilepsy, several cancers (mouth, colorectal, breast), liver cirrhosis, pancreatitis and hypertensive heart disease. ¹⁷⁹ The DHS 2013 showed a strong relationship between alcohol consumption and husband's tendency to be violent. Women whose husbands are often drunk are more likely (67%) to experience any form of violence (emotional, physical or sexual) than women whose husbands do not drink alcohol (48%). ⁸

Unhealthy diets

In the STEPS 2009 survey among adults of 25-64 years ^{174, 175} 91% of both the male and female the respondents ate less than 5 servings of fruits and/or vegetables on average per day, as recommended by WHO. ¹⁸⁰ On average on 3.4 days fruits and on 1.2 days vegetables were consumed, with not much difference between males and females. The average servings also did not differ between males and females and were 1.5 and 1.2 per day respectively for fruits and vegetables.

Preliminary analysis of the recent Bo District CVD risk factor study ¹⁵⁷ among 2071 over 40 year adults showed that most people (around 80%) consumed fewer than 5 portions of fruits and/or vegetables per day and over 90% of participants reported always adding salt to food during preparation. WHO recommends a salt intake of less than 5 grams per day. ¹⁸¹

A diabetes prevalence study in Bo district among 501 adults, published in 1997, found – although there was a higher urban BMI (Body Mass Index) than rural BMI - that dietary habits were similar in both urban and rural adults. ¹⁵⁵

Exclusive breastfeeding under 6 months has increased from 11% (2008) and 32% (2013) to 52.2% in 2017 and 54.1% in 2019. ^{7, 8, 9, 208} Minimum dietary diversity among young children - measured as the percentage of children age 6-23 months who received foods from more than 4 food groups during the previous day - was limited in 2017, only 24.2% and only slightly up from 16% in 2013. ^{7, 8}

The prevalence of any form of anaemia among children 6-59 months remains high over the years; from 76% in 2008 ²⁰⁸ and 80% and 76.3% in 2 studies in 2013 to 67.8% in 2019 ^{8, 9, 182}

The prevalence of any form of anaemia also remains high among women of child-bearing age (15-49 years): 45.2% in 2008 ²⁰⁸ and 44.8% in 2 studies in 2013 to 46.5% in 2019. ^{8, 9, 182}

These high levels of anaemia are thought to be due not only to malaria but also to worm infestations and poor dietary intake of iron rich foods.

Air pollution

Air pollution contributes to many health conditions including lung cancer, lower respiratory tract infections, stroke, ischaemic heart disease, COPD and asthma. There are two main types of air pollution: ambient (outdoor) air pollution and household (indoor) air pollution.^{183, 184, 185}

Outdoor air pollution comes from both natural sources and human activities. Natural sources relevant to Sierra Leone are for example dust storms and forest fires. Major human sources of outdoor air pollution are fuel combustion from motor vehicles, heat and power generation, industrial facilities, municipal and agricultural waste sites and waste incineration/burning and residential cooking, heating and lighting with polluting fuels.¹⁸³

A major source of household air pollution is the incomplete combustion of solid fuels or kerosene for cooking, heating and lighting. Other sources are mould, building materials, home products, volatile organic compounds (VOCs) and naturally occurring gases like radon. Poor ventilation increases the risks from all indoor pollutants.^{184,185}

The ambient and household air pollutants of greatest public health concern are particulate matter especially if less than 10 and 2.5 micron in diameter (PM₁₀ and PM_{2.5}), ozone (O₃), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and carbon monoxide (CO).^{183, 184, 185}

The combined age-standardized ambient and household air pollution attributable death rate (per 100 000 population) was estimated to be 324 for Sierra Leone in 2016. This means a total of 12,441 air pollution attributable deaths (3405 ambient, 9036 household air pollution) for that year.¹⁸⁶ WHO's global Ambient Air Quality Database (update 2018) and WHO's Global Database of Household Air Pollution Measurements do not contain exposure data on Sierra Leone.^{187, 188}

The 2017 MICS study showed that 98.3% of household members lived in a household that primarily relied on polluting fuels and technology for cooking, although only 2.6% cooked in poorly ventilated conditions. The majority cooked outdoors (25% open air, 35.4% on veranda or covered porch) or in a separate building (34.4%).⁷

A 2015 Environment Protection Agency (EPA) study¹⁸⁹ looked at the impact of vehicular traffic on ambient air quality at Freetown roads and found a higher pollution at Kissy Road than at Wilkinson Road. At both roads peak values were observed that are unacceptable if the USA EPA standards would be applied. The study postulated that poorly maintained vehicles, human behavioural pattern and frequent traffic jams attributed to the peak values. The first ever ambient air quality study in Freetown¹⁹⁰ in 2010 and 2011 concluded that there was poor ambient air quality based on the levels of P levels of polycyclic aromatic hydrocarbons (PAHs), suspended particulate matter (SPM) and carbon monoxide (CO) found.

A 2011 study^{191, 192, 193} in and around 15 households using wood and charcoal stoves showed that, after adjusting for confounders, acute respiratory infections (ARI) were significantly more frequent for children in homes with wood stoves (64%) compared with homes with charcoal stoves (44%), but there was no significant difference for women in the same homes (32% versus 24%). The same study showed (potentially) dangerous levels of Carbon Monoxide, including 87% and 67% of 8 hrs CO concentrations in kitchens with charcoal and wood stoves in excess of WHO guidelines, and of PM_{2.5} bound Polycyclic Aromatic Hydrocarbons (PAHs). Another study in the same period in 20 households using wood and charcoal stoves in Western Area rural showed high concentrations of PAH, CO and PM as compared to WHO guidelines.¹⁹⁴

Raised blood pressure or Hypertension

Hypertension, also known as high or raised blood pressure, is defined as a systolic blood pressure is equal to or above 140 mm Hg and/or a diastolic blood pressure equal to or above 90 mm Hg.¹⁹⁵

According to WHO the following contribute to hypertension: eating food containing too much salt and fat; not eating enough fruits and vegetables; being overweight or obese, harmful use of alcohol, physical inactivity, ageing, genetic factors, psychological stress and socioeconomic determinants.¹⁵

The 2009 STEPS survey^{174, 175} found that 34.8% (M 36.6%, F 33.1%) of the respondents had a raised blood pressure or were currently on medication for raised blood pressure. The mean systolic blood pressure (SBP) was 130.8 (M 132.7, F129.0), while the mean diastolic blood pressure was 80.3 (M 80.0, F 80.6).

The reported prevalence of hypertension in the general population in Sierra Leone ranges from 12% to 50%.

A 1998 article reports rural HPT prevalence in rural Kambia district of 17.6% and rural Bo districts of 24.8% based on a total of 463 people.¹⁹⁶ A 1999 article reports age-adjusted hypertension prevalence of 23.4% in urban Freetown (n=598) and rural Port Loko (14.7%), with the difference in prevalence not being significant any more after correcting for BMI and age differences in the two groups.¹⁹⁷ A study in 2016 among 30 undergraduate Njala university students found a prevalence of 12%.¹⁹⁸

A recent study in urban and rural Bo in 2,000 adults over 40 years found a prevalence of 50 %, with significantly higher proportions in respondents that were urban, female, older, more educated or wealthier in the multivariate analysis using population weights.¹⁵⁷

The reported prevalence of hypertension in different patient populations in Sierra Leone ranges from 11% to 68%. A 1993 article reports a prevalence of 68% among 87 stroke in-patients¹⁹⁹. A prevalence of 44.8% was found among self-presenting patients to outreaches by a visiting California medical team across Gambia and Sierra Leone from 2000 to 2009²⁰⁰. A study among 3944 non-pregnant OPD patients in a Bo hospital in 2009 found an age-adjusted prevalence of 19.6% in 15 year and over and 23.6% in 20 years and over.²⁰¹ A 2018 study of 646 adults (20-65 years) in three Western Area urban hospitals found a prevalence of 41.0% with no difference between females (41.5%) and males (40.4%), with higher proportions among older age groups and people with vocational education and physical inactivity.²⁰²

The CHO-MLTP (Community Health Officer-Management & Leadership Training Program)²⁰³ found a prevalence of 11% elevated blood pressure ($\geq 140/90$) among adult outpatients aged ≥ 20 years visiting 69 CHCs in total 10 districts in Sierra Leone.²⁰⁴

The DHIS 2.0 - which counts morbidities at each visit so not unique patients - captured for 2018 in total 36,951 visits and admissions of people with hypertension out of in total 5,003,031 morbidities (0.74%), of which 28,050 from primary health care and 6,446 and 2,455 from hospital out- and inpatient departments respectively. Differentiation between main and additional diagnosis is not possible in the DHIS 2.0.

Overweight/obesity

Overweight and obesity are abnormal or excessive fat accumulation that poses a health risk. They can be measured through the Body Mass Index (BMI), calculated by dividing a person's weight in kilograms by the square of the person's height in meters. A person with a BMI of 30 or more is considered obese, while a person with a BMI of 25 or more (but less than 30) is considered overweight. A BMI of 25 or more is considered a major risk factor for NCDs, including diabetes, cardiovascular diseases and cancer.²⁰⁵ Abdominal obesity can be measured with waist circumference; in the absence of specific Sub-Saharan Africa cut-off it is advised to use the European cut-offs: >80 centimetres for women and >94 centimetres for men.²⁰⁶

An overweight/obesity study of preschool children (0-59 months) in 26 countries in Sub-Sahara Africa showed a mean prevalence of overweight and obesity of 6.8%. Sierra Leone (2013) had a much higher prevalence: 16.9%, consisting of 9.5% obesity and 7.4% overweight. It was estimated that there were 178,126 affected children in Sierra Leone (100,130 obesity; 77,996 overweight).²⁰⁷

A diabetes prevalence study in Bo district among 501 adults, published in 1997, found a mean BMI of 22.3, with significant differences between urban (23.0) and rural (21.6, $p < 0.001$) and significant differences between rural males (20.6) and rural females (22.7). 15% of the adults were overweight, while 5% were obese. Seventy five percent of the obese adults were female. Dietary habits were similar in both urban and rural adults.¹⁵⁵

The mean BMI in the STEPS 2009 survey^{174,175} among adults (25-64 years) was 23.1 (M 22.4, F 23.7). 22.4% of the adults were overweight (M 16.2%, F 28.7%), while the 7.8% were obese (M 4.8%, F 10.8%). The average waist circumference was 76.6 cm in males and 81.7 cm in females, which for females is above the obesity cut-off.

The DHS 2013⁸ found a mean BMI of 22.5 in 7,317 women (15-49 years), this is similar to the DHS 2008²⁰⁸ mean (23.6). 13.4% women were overweight, and 5.0% were obese – which for both was less than in the DHS 2008²⁰⁸ (20.4% and 9.3%). Both increased with age, with 20.4% overweight and 8.9% obesity in the 40-49 year group. There were clearly higher percentages overweight and obesity in urban (17.6%; 9.2%) than in rural areas (9.2%; 2.5%). There is a wide district range for both overweight (6.5-21.2%) and obesity (1.8-10.9%). There is no clear difference by education level. Both increase with increasing wealth, with 18.3% overweight and 11.0% obesity the richest quintile.

A more recent survey in 2017²¹⁰ found 18.4% overweight and 7.5% obesity among 6,712 women 15-49 years, with most obesity in the slums (13.0%) and the urban (14.7%) populations.

The DHS 2013⁸ found a mean BMI of 21.4 in 6,253 men (15-49 years). 6.7% of men were overweight, and 1.5% were obese. Both increased with age, with 9.9% overweight and 3.6% obesity in the 40-49 year group. There is a wide district range, especially for overweight (2.0-15.0%) and less for obesity (0.0-3.5%). There is no clear difference by urban/rural and education level. There is some increase with increasing wealth, with 7.9% overweight and 2.7% obesity in the richest quintile.

In 2010 9.4% of the children below 5 years of age was either overweight or obese (weight for height above 2 Standard Deviation (SD)), this was 4.3% in 2017 – with 1.1 being obese (above 3 SD).^{7,209} The 2017 National nutrition survey found 2.3% overweight and 0.3% severe overweight among children 6-59 months.²¹⁰

A study among 330 Njala undergraduate students in 2016 found a median BMI of 21.7, with a significant difference between males (21.3) and females (23.4). 13.9% were overweight, while 4.2% were obese¹⁹⁸

A recent Bo District CVD risk factor study ¹⁵⁷ in Bo District in 2071 adults aged over 40 years found that 27% was overweight or had obesity, with significantly higher proportions among urban adults, females (36%), younger people, and wealthier respondents in the multivariate analysis using population weights.

Hyperglycaemia (High blood glucose levels)

Hyperglycaemia, or high blood glucose, is used to diagnose diabetes. The WHO diagnostic criteria for diabetes are fasting plasma glucose ≥ 7.0 mmol/l (126mg/dl) or 2-h plasma glucose ≥ 11.1 mmol/l (200mg/dl). ²¹¹ Diabetes was already discussed in a sub-section in Annex 2.

A diabetes prevalence study in Bo district published in 1997 found a mean capillary random blood glucose (RBG) concentration of 5.7 (+/- 1.7) mmol/l for the entire study population, with a not-significantly higher urban RBG (5.8 +/- 2) than rural RBG (5.5 +/- 1.4 mmol/l, $P>0.05$). The RBG increased significantly with age. ¹⁵⁵

Hyperlipidaemia (High levels of fat in the blood) and other metabolic risks

In hyperlipidaemia there are too much fats (lipids), such as cholesterol and triglycerides, in the blood. All NCD (STEPS) and national surveys in Sierra Leone so far have not included cholesterol or other lipid tests, while also the majority of published and recently completed NCD studies did not include lipid testing.

A recent Bo District CVD risk factor study ¹⁵⁷ found hypercholesterolaemia in 6.7% of the 840 over 40 year age adult respondents, with slightly higher proportions in rural residents, males and older people. The risk increased substantially with increased wealth.

The literature review and stakeholder engagements did also not reveal specific Sierra Leone information on other metabolic risks.

Combined risk factors

27.0% of 25-64 years respondents in the STEPS survey in 2009 had 3 or more NCD risk factors. Detail on combined risk factors in the survey is provided in Table 8, showing increased combined risk at higher ages. The proportion with 1-2 NCD risk factors was around 70-75%.

Table 8: Combined risk factors from STEPS 2009

Combined risk factors:			
<ul style="list-style-type: none"> - Current daily smoking - Less than 5 servings of fruits & vegetables per day - Low level of activity - Overweight (BMI ≥ 25 kg/m²) - Raised Blood Pressure (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP) 			
Item	Both Sexes	Male	Female
Percentage with none of the above risk factors	1.4%	1.1%	1.7%
Percentage with three or more of the above risk factors, 25-44 years	22.7%	27.2%	18.6%
Percentage with three or more of the above risk factors, 45-64 years	37.2%	39.9%	33.6%
Percentage with three or more of the above risk factors, 25-64 years	27.0%	31.5%	22.6%

A recent Bo District CVD risk factor study among adults over 40 years found that 77% had at least 1 CVD risk factor (out of hypertension, diabetes, hypercholesterolaemia, obesity and smoking), with higher proportions for males, older people, and wealthier people; but not for urban residents or more educated residents. ¹⁵⁷

Annex 4: NCD Programs and supporters / implementers in Sierra Leone

Intervention	Details	Supporter(s)/ implementers (beyond the MoHS)
FCTC	Support to implementation of the WHO Framework Convention of Tobacco Control (FCTC) including Tobacco investment case, Tobacco legislation	WHO, UNDP
NCDI	Establishment, launch and support of National NCD and Injuries commission	PIH, The Lancet commission,
Policy	Development of new NCD policy and strategic plan	World Bank
Salt reduction	Salt reduction campaign, focus on health promotion	WAHO
Transform Freetown	Transform Freetown 2019-2022 ⁸⁷ - initiative of the Freetown city council in the areas of Resilience, Human Development, Healthy City and Urban mobility. Specific target for NCDs (target 2: By 2022, increase by 20% the adoption of healthy behaviours to reduce specific non-communicable conditions (<i>diabetes, hypertension, reproductive cancers, mental health and substance abuse</i>). NCD Transform Freetown Health Working Group is working on a screening and referral pathway and on the Healthy Freetonians' Campaign: <i>You life depend pan you lifestyle!</i> which includes health awareness days, health festivals and health promoting schools. ^{88,89}	NCD Transform Freetown Health Working Group (Freetown City Council)
Mental Health	Several activities	WHO, Handicap International
NCD training	CHO-MLTP - Management leadership and training program for CHOs in 12 districts. In 10 districts in 69 CHCs also hypertension screening and BP equipment provision (<i>see description under section 3.3.4</i>)	CDC, eHealth Africa
	NCD training and equipment for CHCs, Bombali	VSO, WHO (equipment and supplies for WHO-PEN)
NCD Desk guide	Development NCD desk guide	VSO/RCGP; PIH, LIHS/Nuffield, NIHR Research Unit on Health in Fragility's (RUHF) partners aQueen Margaret University and COMAHS
NCD services	Support to in/outpatient NCD patient care, including NCD clinic days, diagnosis, management, provision of drugs/supplies, special data tools and home based-management of Diabetes patients – Kono Government Hospital	PIH
	Support to setting up stroke register (April 2019), specialised stroke care (2020) while disseminating lessons learnt (2021) and conducting stroke research (results by 2022) at Connaught Hospital	King's Sierra Leone Partnership, COMAHS ^{130, 212}
	Support to in/outpatient NCD patient care at Masanga hospital. Capacare supports CHO surgical training program and hospital running costs (including drugs).	Insulin for Life, CapaCare
	Sickle cell services (see description under section NCD Service delivery 3.3.4)	Sierra Leone Sickle Cell Society (SLSCS)
	Diabetes awareness creation	Friends of Diabetes
	Gestational Diabetes pilot project	CUAMM
Cancer services	Breast and Oncology service at the Connaught hospital	Sierra Leone Cancer Charity
	Children's Cancer service at Ola During Children's Hospital; Freetown: Paediatric cancer: systemic therapy and palliative care. Treating curable cancers i.e. Burkitt's, Retinoblastoma and Wilms' nephroblastoma and supporting palliative care for others. Funding for chemotherapy from Wales and for staff training from Wales and World Child Cancer.	Welbodi, Cardiff and Vale University Health Board World Child Cancer, South Wales Sierra Leone Cancer Care Link.
	Sierra Leone Cancer Society (2012)- Mission: To reduce cancer, while providing the highest level of safe, innovative and compassionate clinical care for patients with cancer and making prevention knowledge and early detection services accessible for every Sierra Leonian	Sierra Leone Cancer Society

	Sierra Leone Cancer Charity (Viji): UK & SL charity established 2010; providing initial funding for the development of the cancer registry. Now focused upon cancer diagnosis, treatment and palliation.	Sierra Leone Cancer Charity (Viji)
	Thinking Pink: SL charity established 2008: Provides advocacy for breast cancer awareness, early detection and treatment for patients with breast cancer.	Thinking Pink
	Well Woman Clinic: Women's health including early cancer detection for breast and cervical cancer.	Well Women Clinic
	South Wales Sierra Leone Cancer Care Link (SWSLCC) - (UK) based Health Care Professionals voluntary organisation, established under MoU 2010 providing training, mentorship and strategic support for: Cancer registry, palliative care and affordable cancer care in children and adults. (Supported by Cardiff and Vale University Health Board and Velindre University NHS Trust – South Wales- UK)	South Wales Sierra Leone Cancer Care Link (SWSLCC)
Palliative care	Connaught Palliative Care Unit (CPCU): Connaught Hospital based palliative care team with outreach to Ola During children's hospital for PC and cancer care and PC home based care service. Sourcing immediate release morphine for the public sector. Ongoing training of PCT, nurses, undergraduate HCW, medical students. Research – scoping exercise in conjunction with NCD directorate, independently funded, and TACPOS, iPOS translation for evaluation of service and clinical use, which has SLESRC approval. Networking with: Well woman, Thinking pink, Cancer Society, Cancer Registry, SWSLCC, (Friends of the) Shepherd's hospice and Sierra Leone Association for Person's with Albinism (SLAPWA).	UK Friends of The Shepherds hospice (UKFTSH)
	Palliative care (in/outpatient and homebased) providing physical and psychological support and training from base at Shepherd's Hospice in MacDonald, Western Area	Friends of Shepherd's Hospice and other donors
Substance abuse	Community engagement program (closed)	GOAL
	Cessation services	SL Psychiatric Teaching Hospital, Medical Missionary Board
	SLAPA - FoRUT (Foundation for Rural and Urban Transformation) was established in 2015 as a national NGO, emerging from FORUT-Sierra Leone, established in 1991 as a Programme of FORUT-Norway. ²¹³ FoRUT is the lead agency in the Sierra Leone Alcohol Policy Alliance (SLAPA) launched 28 th October 2015. SLAPA advocates for changes to Alcohol and Drugs Development policies in Sierra Leone to contribute to reduction of harmful of effects of alcohol and drugs. FoRUT builds multi-purpose centres at schools to support recreational activities with the objective to reduce harm from alcohol and drug abuse among school children and youths.	FoRUT
Village Medical Project	Project in chiefdom Gorama Mende in Kono district, NCD screening and treatment 1 or several times per year. ²¹⁴	Village Medical Project Sierra Leone (VMPSL)
Research / Data	A Scoping Study on Non-Communicable Diseases (NCDs) in Sierra Leone. Idriss et al - Published.	NIHR Research Unit on Health in Fragility at Queen Margaret University, Edinburgh; COMAHS (USL), American University of Beirut, Lebanon ⁷⁵
	Bo District CVD risk factor study among over 40 years adults – 2018 – in analysis phase	University of Birmingham / Wellcome Trust ¹⁵⁷
	Stroke study at Connaught hospital based on longitudinal prospective stroke register launched in April 2019 – in preparatory phases, results expected by 2022.	King's Sierra Leone Partnership, COMAHS ^{130, 212}
	Cancer registry in Freetown	SL Cancer Charity
	Preventing NCDs, with a focus on hypertension, using local structures and social mobilisation in a salt reduction behavioural intervention in Bombali district (in development, expected start mid 2020)	Queen Margaret University, Edinburgh, UK (funded by: National Institute of Health Research, UK)

Annex 5: Proposed M&E framework - Indicator definitions and calculations

Indicator number & name	Definition and calculation
Impact 1. Premature NCD Mortality	<p>Definition: Unconditional probability of dying between the exact ages 30 and 70 years from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.</p> <p>Calculation: Deaths from these four causes will be based on the following ICD codes: I00-I99, C00-C97, E10-E14, and J30-J98. Age-specific death rates for the combined four cause categories (typically in terms of 5- year age groups 30-34 up to 65-69). A life table method allows calculation of the risk of death between exact ages 30 and 70 from any of these causes, in the absence of other causes of death. Then conversion of death rates to probability of dying, combining all 5-year age groups (more detail in Global Framework)</p>
Impact 2. Cancer incidence, by type	<p>Definition: Number of new cancers of a specific site/type occurring in the population per year, usually expressed as the number of new cancers per 100,000 population. Numerator: Number of new cancer cases diagnosed in a specific year. This may include multiple primary cancers occurring in one patient. The primary site reported is the site of origin and not the metastatic site. In general, the incidence rate would not include recurrences.</p> <p>Denominator: At-risk population for the given category of cancer. The population used depends on the rate to be calculated. For cancer sites that occur in only one sex, the sex-specific population (e.g., females for cervical cancer) is used.</p> <p>Calculation: Numerator / Denominator * 100,000</p>
1.1 % of Key NCD area national focal persons	<p>Definition: Percentage of Key NCD areas with national NCD focal persons</p> <p>Numerator: Nr of Key NCD areas with a focal person</p> <p>Denominator: Nr of Key NCD areas</p> <p>Calculation: Numerator / Denominator * 100%</p>
% of districts with focal persons	<p>Definition: Percentage of districts with NCD focal persons</p> <p>Numerator: Nr of districts with NCD focal persons.</p> <p>Denominator: Nr of districts (16)</p> <p>Calculation: Numerator / Denominator * 100%</p>
1.2 % of the NCD Directorate capacity building plan that has been implemented	<p>Definition: Percentage of capacity building activities from the current NCD capacity building plan that have been implemented</p> <p>Numerator: Nr of capacity building activities of the current NCD Directorate capacity building plan that were planned that have been implemented (national and district level)</p> <p>Denominator: Total number of capacity building activities in the current NCD Directorate capacity building plan</p> <p>Calculation: Numerator / Denominator * 100%</p>
1.3 Updated NCD advocacy/briefing package /kit	<p>Definition: NCD advocacy/briefing package/kit updated less than 12 months ago DNCD&MH will answer "yes" if package/kit with update less than 12 months ago is available</p>
1.4 Nr of advocacy meetings with other MoHS entities	<p>Definition: Number of advocacy meetings with other MoHS entities in the last 12 months</p>
1.5 Nr of advocacy meetings with other line ministries	<p>Definition: Number of advocacy meetings with other line ministries in the last 12 months</p>
1.6 Number of engaged politicians/ high profile people	<p>Definition: Number of politicians and high-profile people that have undertaken high level activities on NCDs (for example advocated for increased attention / infrastructure / funding for NCDs)</p>

Indicator number & name	Definition and calculation
	Calculation: Count the number of politicians and high profile people that showed clear engagement with NCDs in the previous 12 months
1.7 Tobacco bill enacted and implemented	Definition: Tobacco bill developed, enacted (made into law) and implemented Answer is yes if bill is enacted and implemented
1.8 Number of advocacy meetings for legislation for NCD risk factors (excluding tobacco)	Definition: Number of advocacy meeting specifically advocating for legislation that reduce the prevalence of NCD risk factors (excluding tobacco) in the past 12 months.
1.9 National policies in place to limit of trans-fats in the food supply	Definition: Adoption of a policy to limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply.
1.10 National policies in place to reduce the impact on children of the marketing of food and non-alcoholic beverages	Definition: Existence of a policy to reduce the impact on children of marketing of foods and non- alcoholic beverages high in saturated fats, trans-fatty acids, free sugars, or salt Country can respond "yes" to the question "Is your country implementing any policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans-fatty acids, free sugars, or salt?"
2.1 Nr of meetings of the fundraising subgroup	Definition: Nr of meetings of the fundraising subgroup (under the NCD TWG) in the last 12 months.
2.2 % of recurrent annual GoSL health (MoHS) recurrent budget allocated to NCD Directorate	Definition: % of recurrent annual GoSL health (MoHS) budget allocated to NCDs Numerator: Total amount for NCD Directorate in recurrent annual GoSL health (MoHS) budget for NCDs Denominator: Total amount of recurrent annual GoSL health (MoHS) budget Calculation: Numerator / Denominator * 100% Note: excluding capital part of the budget from the calculation.
2.3 Nr of local councils (city/district) that have NCD activity budget line in their annual health budget	Definition: Number of local councils (city, district) that have NCD activity budget line in their annual health budget
2.4 Increased number of non-GoSL donors for NCD activities*	Definition: Percentual increase of the number of non-GoSL NCD donors Numerator: number of donors in last 12 months Denominator: number of donors at baseline *will also try to monitor funding amounts as far as possible
3.1 Updated NCD message guide	Definition: NCD message guide with update in the last 24 months
3.2 Proportion of districts where at least 90% of PHU have posters and reading materials to promoted prevention of NCDs	Definition: Number of districts where at least 90% of PHUs have posters and reading materials to educate visitors to promote prevention of NCDs (Tobacco, alcohol, diet, etc.).
3.3 Number of public awareness/ education activities	Definition: Number of Public awareness/education activities at district level (16 districts) about modifiable NCD risk factors and the incidence, prevalence and impact of NCDs aiming at behaviour change (using the IEC/BCC strategy) by the NCD Directorate and its partners in the past 12 months.
3.4 Adult Per Capita Consumption of alcohol	Definition: Consumption of pure alcohol (ethanol) in litres per person aged 15+ during one calendar year. Numerator: Sum of recorded and unrecorded alcohol consumed in a population during a calendar year, in litres. Denominator: Midyear resident population aged 15+ for the same calendar year. Calculation: Numerator/Denominator

Indicator number & name	Definition and calculation
3.5 Prevalence of heavy episodic drinking	<p>Definition: Heavy episodic drinking among survey respondents is defined as those who report drinking 6 (60 grams) or more standard drinks in a single drinking occasion</p> <p>Numerator: Number of persons reporting consuming 60 grams or more of pure alcohol on at least one occasion monthly</p> <p>Denominator: All respondents of the survey</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.6 Prevalence of alcohol-related morbidity and mortality among adults and adolescents (10-19 years)	<p>Definition: Adults and Adolescents (10-19 years) who suffer from disorders attributable to the consumption of alcohol (according to ICD-10: F10.1 Harmful use of alcohol; F10.2 Alcohol dependence) during a given calendar year.</p> <p>Numerator: Number of adults (19+ years) and adolescents (10-19 years) with a diagnosis of F10. or F10.2 during a calendar year. Using the algorithms specified in the validated instruments, presence or absence of harmful use of alcohol or alcohol dependence can be determined. Alcohol Use Disorders (AUD) will be scored if either disease category is present.</p> <p>Denominator: All respondents of the survey aged 10-19 (adolescents) and 19+ years (adults)</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.7 Prevalence of insufficiently physically active persons aged 18+ years	<p>Definition: Percentage of adults aged 18+ years <u>not</u> meeting any of the following criteria:</p> <ul style="list-style-type: none"> – 150 minutes of moderate-intensity physical activity per week – 75 minutes of vigorous-intensity physical activity per week – an equivalent combination of moderate- and vigorous-intensity physical activity accumulating at least 600 MET-minutes* per week <p>Minutes of physical activity can be accumulated over the course of a week but must be of a duration of at least 10 minutes.</p> <p>*MET refers to metabolic equivalent. It is the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1 kcal/kg/hour. Physical activities are frequently classified by their intensity, using the MET as a reference. Numerator: Number of respondents where all 3 of the following criteria are true: (1) Weekly minutes* of vigorous activity < 75 mins.</p> <p>(2) Weekly minutes* of moderate activity < 150 mins.</p> <p>(3) Weekly MET-minutes** < 600.</p> <p>* Weekly minutes is calculated by multiplying the number of days on which vigorous/moderate is done by the number of minutes of vigorous/moderate activity per day.</p> <p>** Weekly MET-minutes is calculated by multiplying the weekly minutes of vigorous activity by 8 and the number of weekly minutes of moderate activity by 4 and then adding these two results together.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.8 Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years	<p>Definition: Mean population intake of salt in grams</p> <p>Numerator: Sum of sodium excretion in urine samples from all respondents aged 18+years. The gold-standard for estimating salt intake is through 24-hour urine collection, however other methods such as spot urines and food frequency surveys may be more feasible to administer at the population level.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator / Denominator</p>
3.9 Age-standardized prevalence of current tobacco use among persons aged 18+ years	<p>Definition: Age-standardized prevalence of current tobacco use among persons aged 18+ years</p> <p>"Smoked tobacco products" includes the consumption of cigarettes, bidis, cigars, cheroots,</p>

Indicator number & name	Definition and calculation
	<p>pipes, shisha (water pipes), fine-cut smoking articles (roll-your-own), krekets, and any other form of smoked tobacco.</p> <p>"Smokeless tobacco" includes moist snuff, plug, creamy snuff, dissolvables, dry snuff, gul, loose leaf, red tooth powder, snus, chimo, gutkha, khaini, gudakhu, zarda, quiwam, dohra, tuibur, nasway, naas/naswar, shammah, betel quid, toombak, pan (betel quid), iq'mik, mishri, tapkeer, tombol and any other tobacco product that is sniffed, held in the mouth, or chewed. Numerator: Number of current tobacco users aged 18+ years. "Current users" includes both daily and non-daily users or smoked or smokeless tobacco.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.10 Age-standardized prevalence of raised blood pressure among persons aged 18+ years	<p>Definition: Systolic blood pressure ≥ 140 and/or diastolic blood pressure ≥ 90 among persons aged 18+ years.</p> <p>Numerator: Number of respondents with systolic blood pressure ≥ 140mmHg or diastolic blood pressure ≥ 90mmHg. Ideally three blood pressure measurements should be taken and the average systolic and diastolic readings of the second and third measures should be used in this calculation.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.11 Age-standardized mean systolic blood pressure in persons aged 18+ years	<p>Definition: Mean systolic blood pressure in persons aged 18+ years</p> <p>Numerator: Sum of systolic blood pressure from all participants aged 18+ years. Ideally three blood pressure measurements should be taken and the average systolic reading of the second and third measures should be used in this calculation.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/ Denominator</p>
3.12 Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years or on medication for raised blood glucose	<p>Definition: Fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) or on medication for raised blood glucose among adults aged 18+ years.</p> <p>Numerator: Number of respondents aged 18+ years with fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) or on medication for raised blood glucose. Fasting blood glucose must be measured, not self-reported, and measurements must be taken after the person has fasted for at least eight hours.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p> <p>Note: There are two main blood chemistry screening methods- dry and wet chemistry. Dry chemistry uses capillary blood taken from a finger and used in a rapid diagnostic test. Wet chemistry uses a venous blood sample with a laboratory based test. Either method is acceptable.)</p>
3.13 Prevalence of overweight and obesity in adolescents (10-19 years)	<p>Definition: According to the WHO growth reference for school-aged children and adolescents (10-19 years), overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex. Numerator 1: Number of adolescent (10-19 years) respondents who are overweight.</p> <p>Numerator 2: Number of adolescent (10-19 years) respondents who are obese.</p> <p>Body mass index (BMI) is calculated by dividing weight in kilograms by height in meters squared. Overweight is ≥ 1SD BMI for age and sex (equivalent to BMI 25kg/m² at 19 years). Obese is ≥ 2SD BMI for age and sex (equivalent to BMI 30kg/m² at 19 years).</p> <p>Denominator: All adolescent (10-19 years) respondents of the survey.</p> <p>Calculation: Numerator 1/Denominator * 100% and Numerator 2/Denominator * 100%</p>
3.14 Age-standardized prevalence of overweight and obesity in persons aged 18+ years	<p>Definition: Body mass index ≥ 25 kg/m² for overweight and body mass index ≥ 30 kg/m² for obesity in adults aged 18+ years.</p> <p>Numerator 1: Number of respondents aged 18+ years who are overweight. Numerator 2: Number of respondents aged 18+ years who are obese.</p> <p>Body mass index (BMI) is calculated by dividing weight in kilograms by height in meters squared. Overweight is defined as having a BMI ≥ 25 kg/m² and obesity is defined as having a BMI ≥ 30 kg/m².</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator 1/Denominator * 100% and Numerator 2/Denominator * 100%</p>

Indicator number & name	Definition and calculation
3.15 Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years	<p>Definition: Mean proportion of total energy intake from saturated fatty acids (SFA) in persons aged 18+ years</p> <p>Numerator: Sum of proportion of SFA of total energy intake from all participants aged 18+years. For each participant, divide the saturated fatty acid intake by the total energy intake to get the proportion of total energy from SFA.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.16 Age-standardized prevalence of persons aged 18+ years consuming less than five total servings (400 grams) of fruit and vegetables per day	<p>Definition: Percentage of population aged 18+ years who eat less than five servings of fruit and/or vegetables on average per day</p> <p>Numerator: Number of respondents aged 18+ years eating less than 5 servings of fruit and/or vegetables per day.</p> <p>The average number of servings of fruit and/or vegetables is calculated for each participant as follows:</p> <p>1) Calculate the average number of vegetable servings per week: total number of vegetable servings per day multiplied by number of days per week vegetables are eaten divided by 7. 2) Calculate the average number of fruit servings per week: total number of fruit servings per day multiplied by number of days per week fruit are eaten divided by 7.</p> <p>3) Sum the average number of vegetable and fruit servings per week.</p> <p>If this total is less than 5, then the participant is counted in the numerator of the equation as eating less than 5 servings of fruit and/or vegetables per day.</p> <p>A serving of fruit or vegetables is equivalent to 80 grams.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.17 Age-standardized prevalence of raised total cholesterol among persons aged 18+ years	<p>Definition: Total cholesterol ≥ 5.0 mmol/L (190 mg/dl).</p> <p>Numerator: Number of respondents aged 18+ years with total cholesterol value ≥ 5.0 mmol/L (190 mg/dl).</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator / Denominator * 100%</p> <p>Note: There are two main blood chemistry screening methods- dry and wet chemistry. Dry chemistry uses capillary blood taken from a finger and used in a rapid diagnostic test. Wet chemistry uses a venous blood sample with a laboratory based test. Either method is acceptable.</p>
3.18 Age-standardized mean total cholesterol among persons aged 18+ years	<p>Definition: Mean total cholesterol.</p> <p>Numerator: Sum of total cholesterol (in mmol/L or mg/dl) from all participants aged 18+ years.</p> <p>Denominator: All respondents of the survey aged 18+ years.</p> <p>Calculation: Numerator / Denominator</p> <p>Note: There are two main blood chemistry screening methods- dry and wet chemistry. Dry chemistry uses capillary blood taken from a finger and used in a rapid diagnostic test. Wet chemistry uses a venous blood sample with a laboratory-based test. Either method is acceptable.</p>
3.19 Nr of new health promotion programs for children, adolescents and young people	<p>Definition: New health promotion programs for children, adolescents and young people to address modifiable risk factors in primary, secondary and vocational schools, polytechnics and universities in the past 12 months stablished through support / advocacy by the NCD Directorate and its partners</p>
3.20 Prevalence of insufficiently physically active adolescents	<p>Definition: Percentage of adolescents (10-19 years) participating in less than 60 minutes of moderate to vigorous intensity physical activity daily.</p> <p>Numerator: Number of adolescent (10-19 years) respondents for whom the number of days per week with <60 minutes of moderate to vigorous intensity activity is <7 days</p> <p>Denominator: All adolescent (10-19 years) respondents of the survey</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.21 Prevalence of current tobacco use among adolescents	<p>Definition: Percentage of adolescents (10-19 yrs) who currently use any tobacco product (smoked or smokeless).</p> <p>"Smoked tobacco products" includes the consumption of cigarettes, bidis, cigars, cheroots, pipes, shisha (water pipes), fine-cut smoking articles (roll-your-own), krekets, and any other form of smoked tobacco.</p>

Indicator number & name	Definition and calculation
	<p>"Smokeless tobacco" includes moist snuff, plug, creamy snuff, dissolvables, dry snuff, gul, loose leaf, red tooth powder, snus, chimo, gutkha, khaini, gudakhu, zarda, quiwam, dohra, tuibur, nasway, naas/naswar, shammah, betel quid, toombak, pan (betel quid), iq'mik, mishri, tapkeer, tombol and any other tobacco product that is sniffed, held in the mouth, or chewed.</p> <p>Numerator: Number of current adolescent (10-19 years) tobacco users. "Current users" includes both daily and non-daily users of smoked or smokeless tobacco.</p> <p>Denominator: All adolescent (10-19 years) respondents of the survey.</p> <p>Calculation: Numerator/Denominator * 100%</p>
3.22 Nr of new physical activity/ sports activities	Definition: Number of new physical activity / sports activities through support/ advocacy by the NCD Directorate and its partners in the past 12 months
3.23 Nr of new public institutions with an encouraging environment for reduced salt intake	Definition: The number of new public (hospitals, schools, workplaces and nursing homes) institutions that are able to provide lower sodium options through advocacy / support by the NCD Directorate and its partners in the past 12 months
4.1 Nr of pre-service students trained using the harmonized reviewed curricula	Definition: Number of pre-service students trained on NCDs using the harmonized revised curricula in the past 12 months
4.2 Nr of in-service staff trained using the harmonized NCD training manual	Definition: Number of in-service staffs trained on NCDs using the harmonized revised curricula in the past 12 months
4.3 Nr of public hospitals with NCD clinic day(s)	Definition: Nr of public hospitals with NCD clinic day(s)
4.4 Nr of districts with at least 5 CHCs providing NCD services according to the Sierra Leone adapted WHO PEN package	Definition: Nr of districts with at least 5 CHCs providing NCD services according to the Sierra Leone adapted WHO PEN package.
4.5 Nr of hospitals implementing Sierra Leone adapted WHO PEN-Plus package	Definition: Nr of hospitals implementing Sierra Leone adapted WHO PEN-Plus package
4.6 Proportion of eligible persons receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes	<p>Definition: Percentage of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular disease (CVD) risk* $\geq 30\%$, including those with existing CVD) receiving drug therapy** and counselling*** (including glycaemic control) to prevent heart attacks and strokes.</p> <p>*A 10-year CVD risk of $\geq 30\%$ is defined according to Age, Sex, other relevant socio- demographic stratifiers where available, blood pressure, smoking status (current smokers OR those who quit smoking less than 1 year before the assessment), total cholesterol, and diabetes (previously diagnosed OR a fasting plasma glucose concentration >7.0 mmol/l (126 mg/dl).</p> <p>**Drug therapy is defined as taking medication for raised blood glucose/diabetes, raised total cholesterol, or raised blood pressure, or taking aspirin or statins to prevent or treat heart disease.</p> <p>***Counselling is defined as receiving advice from a doctor or other health worker to quit using tobacco or not start, reduce salt in diet, eat at least five servings of fruit and/or vegetables per day, reduce fat in diet, start or do more physical activity, maintain a healthy body weight or lose weight. Numerator: Number of eligible survey participants who are receiving drug therapy and counselling. See Denominator for definition of eligible people. Receiving drug therapy and counselling is calculated by self-report from respondents reporting they are taking medication for raised blood glucose/diabetes, raised total cholesterol, or raised blood pressure, or taking aspirin or statins to prevent or treat heart disease; and receiving advice from a doctor or other health worker to quit using tobacco or not start, reduce salt in diet, eat at least five servings of fruit and/or vegetables per day, reduce fat in diet, start or do more physical activity, maintain a healthy body weight or lose weight.</p> <p>Denominator: Total number of eligible survey participants. Eligible people are those people aged 40 and older who either currently self-report that they</p>

Indicator number & name	Definition and calculation
	<p>have existing CVD or who have a 10 year cardiovascular risk of 30 per cent or higher calculated by using the WHO/ISH Risk prediction charts for 14 WHO epidemiological sub-regions which provide the approximate estimates of cardiovascular disease (CVD) risk in people who do not have established coronary heart disease, stroke or other atherosclerotic disease, based on responses to the following: Age, gender, smoking status, SBP, TC and absence or presence of diabetes.</p> <p>Calculation: Numerator / Denominator * 100%</p>
4.7 Percentage of public and private health care facilities who have available essential NCD medicines and basic technologies (detail in definition)	<p>Numerator: Number of facilities that have available during assessment the minimum list of essential medicines and basic technologies. The minimum list is: Medicines - at least aspirin, a statin, an angiotensin converting enzyme inhibitor, thiazide diuretic, a long acting calcium channel blocker, a beta-blocker, metformin, insulin, a bronchodilator and a steroid inhalant. Technologies - at least a blood pressure measurement device, a weighing scale, height measuring equipment, blood sugar and blood cholesterol measurement devices with strips and urine strips for albumin assay.</p> <p>Denominator: Number of surveyed facilities.</p> <p>Calculation: Numerator / Denominator * 100%</p>
4.8 Access to palliative care assessed by oral morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per terminal diagnosis as identified by appropriately trained health care professionals.	<p>Definition: Consumption of morphine-equivalent strong opioid analgesics (excluding methadone) per terminal diagnosis. Morphine- equivalent is a method of standardizing and combining volumes of opioids with differing potencies and is used as a measure of opioid consumption, which is used as the indicator for access to pain and palliation.</p> <p>Numerator: Population-level consumption of morphine-equivalent strong oral opioid analgesics for a given time period.</p> <p>Levels of consumption of opioid medicines in kilograms or grams (for Fentanyl) are calculated by the INCB on the basis of statistics on manufacture and trade provided by Governments. Consumed quantities include those distributed by wholesalers or manufacturers to retailers (mainly pharmacies and hospitals) plus quantities imported directly by retailers. In countries where the retailers obtain their supply from abroad, quantities declared as imported are considered to be destined for consumption. Therefore the average reported consumption for the previous three-year period in many cases provides a more accurate estimate of actual consumption since volumes procured in one year may be consumed in the following year.</p> <p>Morphine-equivalent volumes are calculated as: (1*morphine)+(83.3*fentanyl)+(5*hydromorphone)+(1.33*oxycodone)+ (0.25*pethidine)</p> <p>Denominator: Number of terminal diagnoses occurring in the population over the same time period.</p> <p>Calculation: Numerator/Denominator</p>
4.9 Availability of vaccines against human papillomavirus	Definition: Availability of HPV vaccines as part of a national immunization schedule
4.10 Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants	<p>Numerator: Number of children aged 12-23 months participating in the survey who received three doses of hepatitis B vaccine any time before the survey (MICS: by their first birthday)</p> <p>Denominator: Number of children aged 12-23 months who participated in the survey</p> <p>Calculation: Numerator/Denominator * 100%</p>
4.11 Proportion of women between the ages of 30–49 screened for cervical cancer at least once in the last 5 years	<p>Definition: Proportion of women aged 30 - 49 who report they were screened for cervical cancer using any of the following methods: Visual Inspection with Acetic Acid/vinegar (VIA), pap smear and Human Papillomavirus (HPV) test.</p> <p>Numerator: Number of women aged 30-49 who report ever having had a screening test for cervical cancer using any of these methods: Visual Inspection with Acetic Acid/vinegar (VIA), pap smear and Human Papillomavirus (HPV) test.</p> <p>Denominator: All female respondents aged 30-49.</p> <p>Calculation: Numerator / Denominator * 100%</p>
4.12 Nr PEN-CHCs where surrounding communities / families are providing (support to) NCD management and care	Definition: Nr PEN-CHCs where surrounding communities / families are providing (support to) NCD management and care

Indicator number & name	Definition and calculation
4.13 % of NCD service sites with updated NCD guidelines /protocols for PHUs and Hospitals	Definition: Percentage of NCD services sites with updated NCD guidelines/ protocols present in the past 12 months.
5.1 Nr of NCDI commission meetings	Definition: Number of quarterly meeting of the national multisectoral NCDI commission in the past 12 months.
5.2 Nr of National TWG meetings	Definition: Number of (at least) quarterly meetings of the national TWGs in the past 12 months, disaggregated by type
5.3 Nr of District NCD committee meetings in each of the 16 districts	Definition: Number of monthly meetings of the district NCD committees in the past 12 months, disaggregated by district
5.4 Nr of stakeholder orientation meetings on NCD prevention and control	Definition: Number of orientation meetings held with stakeholders on NCD prevention and control in the past 12 months
5.5 Number of community engagement activities at district level on NCDs	Definition: Number of community engagement activities at district level (16 districts) about NCDs by the NCD Directorate and its partners in the past 12 months.
5.6 Presence of an actively updated database with all relevant NCD partners	Definition: Active updated database with all relevant NCD partners (implementers, stakeholders, partners, donors) is available. Last update not older than 6 months.
5.7 Attendance of partners to harmonization / joint development meetings	Definition: At least 50% of the relevant partners (from the database) attend harmonization/ joint development meetings for new programs / guidelines for prevention / control programs
6.1 Nr of STEPS surveys conducted in the last 12 months	Definition: Nr of STEPS surveys conducted in the last 12 months (take the date of data collection as the date of conducting)
6.2 Nr of quarterly NCD data analysis reports	Definition: Nr of Quarterly extraction and analysis reports of DHIS NCD data in the last 12 months.
6.3 Number of annual review meetings	Definition: Nr of Annual review meetings held in the last 12 months to discuss amongst others epidemiological trends of NCDs and their determinants
6.4 Nr of districts that received national NCD supervision	Definition: Nr of districts that had an annual supervision visit by DNCD&MH in the last 12 months
6.5 Nr of districts with 90% NCD health facility supervision	Definition: Nr of districts that visited 90% of health facilities that provide NCD services at least once a year for comprehensive NCD supervision
6.6 Nr of regions covered by cancer registry	Definition: Number of regions covered by the cancer registry
6.7 Inclusion of cancer registry in DHIS/HMIS	Definition: Inclusion of either aggregated or patient level cancer registry into digitized national systems (DHIS or other entity in the HMIS) Establish if inclusion is in place at the moment
6.8 Existence joint NCD research agenda based on national priorities	Definition: Joint NCD research agenda based on current national priorities is in existence
6.9 Number of Annual NCD research meetings	Definition: Annual NCD research meeting to present NCD research and identify NCD research agenda
6.10 Number of NCD researches conducted	Definition: Nr of NCD researches that were conducted and finalized in the last year, as per the final research reports

Annex 6: References and notes

- ¹ Census 2015 populations projections report, Statistics Sierra Leone.
- ² Census 2015 national analytical report, Statistics Sierra Leone.
- ³ Human Development Reports, United Nations Development Programme, <http://hdr.undp.org/en/composite/GII>, accessed 25th July 2019.
- ⁴ The World Bank in Sierra Leone – Overview, <https://www.worldbank.org/en/country/sierraleone/overview>, accessed 25th July 2019.
- ⁵ Provisional results of the 2018 Sierra Leone Integrated Household Survey, Statistics Sierra Leone
- ⁶ Report on the 2016 and 2017 Real Gross Domestic Product (RGDP) Figures at 2006 Prices, Statistics Sierra Leone National Accounts Units, Statistics Sierra Leone, August 2018.
- ⁷ Sierra Leone Multiple Indicator Cluster Survey 2017, Survey Findings Report. Freetown, Sierra Leone: Statistics Sierra Leone.
- ⁸ Sierra Leone Demographic and Health Survey 2013. Statistics Sierra Leone (SSL) and ICF International. 2014. Freetown, Sierra Leone and Rockville, Maryland, USA: SSL and ICF International.
- ⁹ SLDHS 2019. Statistics Sierra Leone (Stats SL) and ICF. 2019. Sierra Leone Demographic and Health Survey 2019: Key Indicators. Freetown, Sierra Leone, and Rockville, Maryland, USA: Stats SL and ICF.
- ¹⁰ Sierra Leone Tuberculosis profile 2017. Generated 14 August 2019. World Health Organization. https://extranet.who.int/sree/Reports?op=Replet&name=WHO_HQ_Reports/G2/PROD/EXT/TBCountryProfile&ISO2=SL&outtype=html.
- ¹¹ Data from Directorate of Human Resources for Health, Ministry of Health and Sanitation, mentioned in the Annual Health Sector Performance Report 2016, Ministry of Health and Sanitation, Government of Sierra Leone. <https://www.afro.who.int/sites/default/files/2017-08/Sierra%20Leone%20Health%20Sector%20%20Performance%20Report%202016.pdf>
- ¹² Data from the DHIS 2.0 of the, Ministry of Health and Sanitation in Sierra Leone, mentioned in the Annual Health Sector Performance Report 2016, Ministry of Health and Sanitation, Government of Sierra Leone. <https://www.afro.who.int/sites/default/files/2017-08/Sierra%20Leone%20Health%20Sector%20%20Performance%20Report%202016.pdf>
- ¹³ Data from the National Health Account reports from 2013 and 2014 as mentioned in the Annual Health Sector Performance Report 2016, Ministry of Health and Sanitation, Government of Sierra Leone. <https://www.afro.who.int/sites/default/files/2017-08/Sierra%20Leone%20Health%20Sector%20%20Performance%20Report%202016.pdf>
- ¹⁴ WHO Factsheet: Noncommunicable diseases, 1 June 2018, <https://www.who.int/en/news-room/fact-sheets/detail/noncommunicable-diseases>, accessed 21 April 2019
- ¹⁵ Global Status Report on noncommunicable disease 2014 – “Attaining the nine global noncommunicable diseases targets; a shared responsibility”. World Health Organization. 2014.
- ¹⁶ Global Status Report on noncommunicable diseases 2010. World Health Organization. 2011.
- ¹⁷ Chronic Non-communicable Diseases in Low and Middle-income Countries. Book. Edited by A de-Graft Aikins, London School of Economics and Political Science, UK and University of Ghana, C Agyemang, Department of Public Health, The Netherlands December 2015 / ISBN 9781780643328.
- ¹⁸ Behavioral science in diabetes. Contributions and opportunities. Diabetes Care. 1999 May;22(5):832-43.
- ¹⁹ NCD related Sustainable Development Goals (SDGs) from <https://www.un.org/sustainabledevelopment/health/>, accessed 5th February 2019.
- ²⁰ Prevention and control of noncommunicable diseases. Resolution at the fifty-third World Health Assembly WHA53.17, Agenda item 12.11, 20 May 2000.
- ²¹ WHO Global Meeting to Accelerate Progress on SDG target 3.4 on NCDs and Mental Health, 9-12 December 2019. <https://www.who.int/news-room/events/detail/2019/12/09/default-calendar/ncds2019>. Accessed 2 February 2020.
- ²² Global Strategy on Diet, Physical Activity and Health, World Health Organization, 2014.
- ²³ Set of recommendations on the marketing of foods and non-alcoholic beverages to children. ISBN 978 92 4 150021 0. World Health Organization 2010.
- ²⁴ Global strategy to reduce the harmful use of alcohol. ISBN 978 92 4 159993 1. World Health Organization 2010. Endorsed at 63rd World Health Assembly, https://www.who.int/substance_abuse/msbalestrategy.pdf
- ²⁵ Reduction of the Harmful Use of Alcohol: A Strategy for the WHO African Region, WHO Regional Office, https://www.afro.who.int/sites/default/files/sessions/working_documents/afr_rc60_4_version3.pdf and <https://www.afro.who.int/sites/default/files/2017-06/ahm1608.pdf>
- ²⁶ Global action plan for the prevention and control of noncommunicable diseases 2013-2020. ISBN 978 92 4 150623 6. World Health Organization 2013.
- ²⁷ WHO Framework Convention on Tobacco Control. ISBN 978 92 4 159101 0 (LC/NLM classification: HD 9130.6). World Health Organization 2003, updated reprint 2004, 2005.
- ²⁸ The SHAKE Technical Package for Salt Reduction. World Health Organization 2016.

- ²⁹ Global voluntary targets from: A66/8.ReportbytheDirector-General.Draftcomprehensiveglobalmonitoringframework and targets for the prevention and control of noncommunicable diseases. Formal Meeting of Member States to conclude the work on the comprehensive global monitoring framework, including indicators, and a set of voluntary global targets for the prevention and control of noncommunicable diseases. In: Sixty-sixth World Health Assembly, Geneva, 20–27 May 2013. Provisional agenda item 13.1. Geneva: World Health Organization; 2013 (http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_8-en.pdf?ua=1, accessed 18 September 2015).
- ³⁰ Third United Nations High-level Meeting on NCDs, 27 September 2018, <https://www.unscn.org/en/news-events/recent-news?idnews=1835>, accessed 30th July 2019.
- ³¹ Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings. ISBN 978 92 4 159899 6. World Health Organization 2010.
- ³² ‘Best buys’ and other recommended interventions for the prevention and control of noncommunicable diseases Updated (2017) appendix 3 of the global action plan for the prevention and control of noncommunicable diseases 2013-2020.
- ³³ The International dollar is a hypothetical unit of currency that has the same purchasing power parity that the U.S. dollar had in the United States at a given point in time.
- ³⁴ Training Manual - WHO Package of Essential NCD Interventions (PEN) Service delivery and program management. WHO Collaborating Centre for Capacity Building and Research in Community- based Noncommunicable Disease Prevention and Control, Centre for Community Medicine, All India Institute of Medical Sciences (AIIMS), New Delhi, India, 2018.
- ³⁵ Draft Regional Strategy for PEN-Plus. WHO Regional Office for Africa. July 2019.
- ³⁶ Africa Health Strategy 2016-2030. African Union. No date.
- ³⁷ The Finance (Amendment) Act, 2018 [No. 12 of 2018]. Supplement to the Sierra Leone Extraordinary Gazette Vol. CXLIX, No. 64 dated 19th July, 2018
- ³⁸ Quigley N, Kamara MS, Gangadhar Y, Paybeyee D, Chandralal R. The United Nations Convention on the Rights of Persons with Disabilities: From the Perspective of Young People. *Disabil Stud Q.* 2009;29(1):1-10.
- ³⁹ Government of Sierra Leone. Constitution of Sierra Leone. *Sierra Leone Gazette, Supplement, Extraordinary*, 1991-09-25, Vol. 122, No. 59, pp. 1-124; 1991. www.sierra-leone.org/Laws/constitution1991.pdf%0A%0A.
- ⁴⁰ Government of Sierra Leone. Child Right Act. Supplement to the Sierra Leone Gazette Extraordinary Vol. CXXXVIII, No 43. Dated 3rd September 2007; 2007.
- ⁴¹ Government of Sierra Leone. The Persons with Disability Act.; 2011.
- ⁴² Deen-Tarawally JT. The status of the rights of persons with disabilities in Sierra Leone and the need for paradigm shift from political lip service. 2018.
- ⁴³ Committee on the Rights of the Child. List of issues in relation to the consolidated third to fifth periodic report of Sierra Leone. *CRC/C/SLE/Q/3-5/Add.1.* 2016;(September).
- ⁴⁴ Government of Sierra Leone. Public Health Ordinance.1960.
- ⁴⁵ Government of Sierra Leone. Public Health Amendment Act. Vol. CXXXV, No. 49, dated 26th August, 2004; 2004.
- ⁴⁶ Government of Sierra Leone. The Lunacy Act. 1902.
- ⁴⁷ Sierra Leone Colony and Protectorate. Dangerous Drugs Ordinance.; 1926.
- ⁴⁸ The Liquor Act (Cap. 237). Published 19th February, 1976. Public Notice No. 4 of 1976.
- ⁴⁹ Palm Wine Ordinance (Cap. 239). Published 1927.
- ⁵⁰ Liquor Licensing Ordinance (Cap. 238). Published 1960.
- ⁵¹ National Policy on Non-Communicable Diseases, Republic of Sierra Leone, Ministry of Health and Sanitation, May 2013.
- ⁵² National Non-Communicable Diseases Strategic Plan 2013-2017, Republic of Sierra Leone, Ministry of Health and Sanitation, May 2013.
- ⁵³ Ministry of Health and Sanitation. Mental Health Policy 2019-2023.
- ⁵⁴ Ministry of Health and Sanitation. Mental Health Strategic Plan 2019-2023.
- ⁵⁵ National Rehabilitation Programme, Annual Work Program, 2019
- ⁵⁶ National Physical and Rehabilitation Policy – mentioned in “Health Ministry launches Physical and Rehabilitation Policy” article in Awoko newspaper, 26th July 2012, accessed online at <http://awoko.org/2012/07/26/health-ministry-launches-physical-and-rehabilitation-policy/?pr=99435&lang=en>
- ⁵⁷ National Health Promotion Strategy of Sierra Leone (2017-2021). Government of Sierra Leone, Ministry of Health and Sanitation, Health Education Division. 2016.
- ⁵⁸ Sierra Leone National Food and Nutrition Security Policy 2012-2016. Ministry of Health and Sanitation. No date.
- ⁵⁹ National Food and Nutrition Security Implementation Plan 2013-2017. Government of Sierra Leone & Scaling Up Nutrition (SUN). No date.
- ⁶⁰ Environment Protection Agency Act, 2008. Supplement to the Sierra Leone Gazette Vol. CXXXIC, No. 44 dated 11th September 2008. Government of Sierra Leone.
- ⁶¹ Environment Protection Agency Strategic Plan 2017-2021, Environment Protection Agency (EPA), Republic of Sierra Leone.
- ⁶² Sierra Leone National Climate Change Strategy and Action Plan, 2013, Environment Protection Agency (EPA), Republic of Sierra Leone.

- ⁶³ The Road Transport Authority Act, 1996. Supplement to the Sierra Leone Gazette Volume CXXVIII, No. 3, dated 9th January 1997.
- ⁶⁴ The Road Traffic Act, 2007. Accessed online at <http://www.sierra-leone.org/Laws/2007-5p.pdf>
- ⁶⁵ Sierra Leone Launches National Road Safety Policy, Strategy and Trust Fund. WHO Africa. Accessed on <https://www.afro.who.int/news/sierra-leone-launches-national-road-safety-policy-strategy-and-trust-fund>
- ⁶⁶ Website of Ministry of Youth Affairs. See <https://www.youthaffairs.gov.sl/>.
- ⁶⁷ The National Youth Commission Act, 2009. See <https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/87734/100127/F1924938909/SLE87734.pdf>
- ⁶⁸ Website of the National Youth Commission. See <http://www.nationalyouthcommission.sl/>.
- ⁶⁹ Review of the Sierra Leone National Youth Policy. First draft. 20 November 2012.
- ⁷⁰ Website of the Ministry of Information and Communications (MIC), Government of Sierra Leone. <http://mic.gov.sl/>.
- ⁷¹ Physical Health Education Division. Accessed online in February 2020 on <http://www.education.gov.sl/PDF/Team/Physical%20Health%20Education%20Division.pdf>
- ⁷² Schools Feeding Coordination Unit. Accessed online in February 2020 at <http://www.education.gov.sl/PDF/Team/Schools%20Feeding%20Coordination%20Unit.pdf>
- ⁷³ The Guidance and Counseling Unit. Accessed online in February 2020 at <http://www.education.gov.sl/PDF/Team/The%20Guidance%20and%20Counseling%20Unit.pdf>
- ⁷⁴ MoHS 2019 budget Excel file with 3 worksheets: 2019 MOHS RECURRENT BUDGET, 2019 MOHS Domestic Capital Budget and Deliverables.
- ⁷⁵ A Scoping Study on Non-Communicable Diseases (NCDs) in Sierra Leone. Ayesha Idriss, Haja R Wurie, Maria Bertone, Kelly Elimian, Nicole Vidal and Mohamed Samai. NIHR Research Unit on Health in Fragility at Queen Margaret University, Edinburgh; College of Medicine and Allied Health Sciences (COMAHS), University of Sierra Leone; American University of Beirut, Lebanon. May 2018.
- ⁷⁶ Non-Communicable Diseases: Diagnosis and Treatment Deskguide. Ministry of Health, Sierra Leone, January 2019. Accessed online in February 2020 at: <https://www.qmu.ac.uk/media/6507/nihr-ncd-clinical-deskguide-sierraleone.pdf>
- ⁷⁷ Sierra Leone: Radiotherapy facility formation at advanced stage. Sierra Express Media. 18th May 2019. Accessed 5th November 2019: <http://sierraexpressmedia.com/?p=87631>
- ⁷⁸ Managing the ever-increasing demand for cancer services in the developing world. In: Cancer Control, IAEA Bulletin, September 2019. International Atomic Energy Agency (IAEA).
- ⁷⁹ Personal communication from Dr Mary Bunn, Palliative Care doctor at the Palliative Care Clinic in Connaught Hospital, Freetown, 19th September 2019.
- ⁸⁰ WHO cancer pain ladder. See <https://www.who.int/cancer/palliative/painladder/en/>
- ⁸¹ Knaul FM et al. Alleviating the access abyss in palliative care and pain relief – an imperative of universal health coverage: The Lancet Commission report. March 2018
- ⁸² Met and unmet needs for surgery in Sierra Leone: A comprehensive, retrospective, countrywide survey from all health care facilities performing operations in 2012. Bolkan HA, Von Schreeb J, Samai MM, Bash-Taqi DA, Kamara TB, Salvesen Ø, Ystgaard B, Wibe A. Surgery. 2015 Jun;157(6):992-1001. doi: 10.1016/j.surg.2014.12.028. Epub 2015 Apr 28.
- ⁸³ First field visit related to NCD policy/strategy review and development new policy/strategy – 19 and 20 March 2019.
- ⁸⁴ Second field visit related to NCD policy/strategy review and development new policy/strategy – 2 and 3 April 2019.
- ⁸⁵ Knowledge of breast cancer in women in Sierra Leone. Shepherd JH, McInerney PA. Curationis. 2006 Aug;29(3):70-7.
- ⁸⁶ Knowledge of breast self-examination in women in Sierra Leone. Shepherd JH, McInerney PA. Curationis. 2007 Dec;30(4):38-44.
- ⁸⁷ Transform Freetown: An Overview, 2019-2022. Her Worship the Mayor, Yvonne Aki-Sawyerr, OBE, Councillors and Staff of the Freetown City Council. 24th January 2019.
- ⁸⁸ Developing a NCD care pathway in Freetown. Reflection of the discussion with the NCD Transform Freetown Health Working Group. 20 May 2019.
- ⁸⁹ Summary of Healthy Freetonians Campaign. TransformFreetown Health Working Group. April 2019
- ⁹⁰ UNIPSIL, United Nations Human Rights Office of the High Commissioner. Moving Forward Together: From National Commitment to Concrete Action. Report on the Rights of Persons with Disabilities in Sierra Leone. 2011. https://unipsil.unmissions.org/sites/default/files/movng_forwrd_rghts_person_disabilities.pdf.
- ⁹¹ Personal communication Mr. Abdul Otonjo Conteh, Registrar, Cancer Registry, August 2018.
- ⁹² Integrated Mission of PACT – imPACT – Cancer Control Capacity and Needs Assessment Report submitted to the Ministry of Health and Sanitation, Sierra Leone, November-December 2016. Programme of Action for Cancer Therapy (PACT), IAEA, WHO Regional Office for the Eastern Mediterranean, International Agency for Research on Cancer – WHO.
- ⁹³ Idriss A, Diaconu K, Zou G, et al. Rural-urban health-seeking behaviours for non-communicable diseases in Sierra Leone. BMJ Global Health 2020;5:e002024. doi:10.1136/bmjgh-2019-002024
- ⁹⁴ Actual document not found. Reference in COMAHS scoping study: Galway, D.C. (2013) 'Context' in pp.28-29.
- ⁹⁵ Herbal medicine use among hypertensive patients attending public and private health facilities in Freetown Sierra Leone. James PB, Kamara H, Bah AJ, Steel A, Wardle J. Complement Ther Clin Pract. 2018 May; 31:7-15. doi: 10.1016/j.ctcp.2018.01.001. Epub 2018 Jan 5.
- ⁹⁶ Violence and the body: somatic expressions of trauma and vulnerability during war. Henry D. Med Anthropol Q. 2006 Sep;20(3):379-98.

- ⁹⁷ Integrated people-centered health services, WHO. Accessed 13th June 2019: <https://www.who.int/servicedeliverysafety/areas/people-centred-care/ipchs-what/en/>
- ⁹⁸ Universal Health Coverage, WHO. Accessed 13th June 2019: https://www.who.int/healthsystems/universal_health_coverage/en/
- ⁹⁹ WHO Best Buys. Accessed 13th June 2019. <https://www.who.int/ncds/management/best-buys/en/>
- ¹⁰⁰ Mission, Vision and Goal – MoHS website. Ministry of Health and Sanitation, Government of Sierra Leone. <http://health.gov.sl/index.php/page/mission-vision-goal>. Accessed 15th August 2019.
- ¹⁰¹ Sierra Leone's Medium-Term National Development Plan 2019-2023 – Education for Development: A New Direction for Improving People's Lives through Education, Inclusive Growth, and Building a Resilient Economy. Volume I & II. Republic of Sierra Leone.
- ¹⁰² National Health Policy 2002 - revised in 2009. Ministry of Health and Sanitation, 2009.
- ¹⁰³ National Health Sector Strategic Plan 2017-2021. Ministry of Health and Sanitation, 2017.
- ¹⁰⁴ Basic Package of Essential Health Services 2015-2020. Ministry of Health and Sanitation, 2015.
- ¹⁰⁵ Free healthcare services for pregnant and lactating women and young children in Sierra Leone. Government of Sierra Leone, 2009.
- ¹⁰⁶ Global compact for progress towards universal health coverage. UHC2030. 2018. https://www.uhc2030.org/fileadmin/uploads/uhc2030/Documents/About_UHC2030/mgt_arrangemts___docs/UHC2030_Official_documents/UHC2030_Global_Compact_WEB.pdf.
- ¹⁰⁷ UHC Scoping Mission Debrief for Stakeholders. World Health Organization. 2018.
- ¹⁰⁸ Summary Report of the 2017 SARA Plus in Sierra Leone: Service Availability and Readiness Assessment (SARA), Quality of Care Survey, and Data Quality Review, Government of Sierra Leone, Ministry of Health and Sanitation, 2017.
- ¹⁰⁹ National Community Health Worker Policy 2016-2020, The Republic of Sierra Leone, Ministry of Health and Sanitation, 11th October 2016.
- ¹¹⁰ Health Service Delivery in Sierra Leone, Results of 2018 Service Delivery Indicator Survey. World Bank Africa, GHNDR and GEDDR, June 2018.
- ¹¹¹ National Health Accounts 2013, Ministry of Health and Sanitation. 2014.
- ¹¹² The Sierra Leone Social Health Insurance Act, 2017. Supplement to the Sierra Leone Gazette Vol. CXLVIII, No. 8, dated 1st December 2017. Republic of Sierra Leone.
- ¹¹³ Project Memo Health Insurance Engagement. Glennerster RR, Karing A, Verma P.
- ¹¹⁴ Willingness to pay for health insurance in the informal sector of Sierra Leone. Jofre-Bonet M, Kamara J. PLoS One. 2018;13(5): e0189915. doi: 10.1371/journal.pone.0189915.
- ¹¹⁵ Human Resources for Health Policy 2017-2021. Ministry of Health and Sanitation, Government of Sierra Leone, 2017.
- ¹¹⁶ Human Resources for Health Strategy 2017-2021. Ministry of Health and Sanitation, Government of Sierra Leone, 2017.
- ¹¹⁷ Human Resources for Health Country Profile 2016. Ministry of Health and Sanitation, Government of Sierra Leone. 2016.
- ¹¹⁸ Health workforce requirements for universal health coverage and the Sustainable Development Goals. World Health Organization. ISBN 978 92 4 151140 7 (NLM classification: W 76). World Health Organization 2016
- ¹¹⁹ Standards & Guidelines for Water, Sanitation and Hygiene (WASH) Services in Healthcare facilities in Sierra Leone. Government of Sierra Leone, Ministry of Health and Sanitation, February 2017.
- ¹²⁰ National Medicines Policy. Republic of Sierra Leone, Ministry of Health and Sanitation. 2012.
- ¹²¹ National Essential Medicines List, 2016 Edition (Revised). Republic of Sierra Leone, Ministry of Health and Sanitation. 2016.
- ¹²² The Standard Treatment Guidelines for Primary Level prescribers. Republic of Sierra Leone, Ministry of Health and Sanitation. 2012
- ¹²³ The National Formulary. Republic of Sierra Leone, Ministry of Health and Sanitation. 2012.
- ¹²⁴ National Health Laboratory Strategic Plan 2016-2020 – Delivering Quality Laboratory Services. Republic of Sierra Leone, Ministry of Health and Sanitation.
- ¹²⁵ The National Medical Supplies Agency Act, 2017. Supplement to the Sierra Leone Gazette Vol. CXLVIII, No. 76 dated 2nd November 2017.
- ¹²⁶ National Medical Supplies Agency of Sierra Leone. NPPU Reform Phase II. Draft Operational Plan 2017-2018 24 January 2017.
- ¹²⁷ Noncommunicable diseases country profiles 2018 ISBN 978-92-4-151462-0, World Health Organization 2018 <https://www.who.int/nmh/publications/ncd-profiles-2018/en/>
- ¹²⁸ World health statistics 2018: monitoring health for the SDGs, sustainable development goals ISBN 978-92-4-156558-5, World Health Organization 2018 <https://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf?ua=1>
- ¹²⁹ Sierra Leone Country Profile 2017. Institute for Health Metrics and Evaluation (IHME). <http://www.healthdata.org/sierra-leone>. Accessed 5th August 2019.
- ¹³⁰ Stroke in Sierra Leone, a prospective stroke register. Youkee D, Deen GF, Lisk R, Sackley CS. August 2019.
- ¹³¹ Cardiovascular Diseases (CVDs) fact sheet, World Health Organization, 17 May 2017. [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)).

- ¹³² Sierra Leone Cancer Fact Sheet 2018, Globocan 2018, The Global Cancer Observatory, International Agency for Research on Cancer, World Health Organization, May 2019. <http://gco.iarc.fr/today/data/factsheets/populations/694-sierra-leone-fact-sheets.pdf>.
- ¹³³ Personal communication from Professor Richard Adams, Consultant Professor Oncology, South Wales - Sierra Leone Cancer Care Link and Director Centre for Trials Research – Cancer Division & Director Wales Cancer Bank & Professor and Honorary Consultant Clinical Oncologist, Cardiff University and Velindre Cancer Centre, University Hospital of Wales.
- ¹³⁴ Personal communication from Dr. Mary Bunn, Palliative Care Doctor, Connaught Palliative Care Team, January 2020. Data covering period September 2018 – November 2019.
- ¹³⁵ National Cancer Registry Sierra Leone. Data for 2015-2018, personal communication Mr. Abdul Otonjo Conteh, Registrar, August 2018.
- ¹³⁶ The spread of cancer among the descendant of the liberated Africans or Creole of Sierra Leone. Renner, W. The British Medical Journal, 1910, v.2(2592), pp. 587–589.
- ¹³⁷ Cancer and the creoles of Sierra Leone. Renner W.M. British Medical Journal, 2014, pp. 110–111.
- ¹³⁸ Prevalence of breast masses and barriers to care: results from a population-based survey in Rwanda and Sierra Leone. Ntirenganya F, Petroze RT, Kamara TB, Groen RS, Kushner AL, Kyamanywa P, Calland JF, Kingham TP. J Surg Oncol. 2014 Dec;110(8):903-6. doi: 10.1002/jso.23726. Epub 2014 Aug 2.
- ¹³⁹ Non-communicable diseases in the Western Area District, Sierra Leone, before and during the Ebola outbreak. Samba T, Bhat P, Owiti P, Samuels L, Kanneh PJ, Paul R, Kargbo B, Harries AD. Public Health Action. 2017;7(1):16–21.
- ¹⁴⁰ Cancer Prevention. World Health Organization. <https://www.who.int/cancer/prevention/en/>. Accessed July 2019.
- ¹⁴¹ Hidden dangers-prevalence of blood borne pathogens, hepatitis B, C, HIV and syphilis, among blood donors in Sierra Leone in 2016: opportunities for improvement: a retrospective, cross-sectional study. Yambasu EE, Reid A, Owiti P, Manzi M, Murray MJS, Edwin AK. Pan Afr Med J. 2018 May 18; 30:44. doi: 10.11604/pamj.2018.30.44.14663. eCollection 2018.
- ¹⁴² Hepatitis B and C in Tonkolili Province, Sierra Leone. García-Tardón N, Gresnigt TM, Fofanah AB, Grobusch MP. Lancet. 2017 Sep 23;390(10101):1485. doi: 10.1016/S0140-6736(17)32390-5.
- ¹⁴³ Cross sectional study of chronic hepatitis B prevalence among healthcare workers in an urban setting, Sierra Leone. Massaquoi TA, Burke RM, Yang G, Lakoh S, Sevalie S, Li B, Jia H, Huang L, Deen GF, Beynon F, Sahr F. PLoS One. 2018 Aug 10;13(8):e0201820. doi: 10.1371/journal.pone.0201820. eCollection 2018.
- ¹⁴⁴ Next-generation Sequencing Study of Pathogens in Serum from Patients with Febrile Jaundice in Sierra Leone. Zhang Y, Ye F, Xia LX, Zhu LW, Kamara IL, Huang KQ, Zhang Y, Liu J, Kargbo B, Wang J, Liang MF, Song JD, Ma XJ, Wu GZ. Biomed Environ Sci. 2019 May;32(5):363-370. doi: 10.3967/bes2019.048.
- ¹⁴⁵ Seroprevalence of Hepatitis B, Hepatitis C, and Human T-Cell Lymphotropic Virus Infections in HIV-Infected Patients in Sierra Leone. Yendewa GA, Sahr F, Aguilera A, Lakoh S, Sesay M, Deen GF, Patiño L, Poveda E, Salata RA. Am J Trop Med Hyg. 2019 Jun;100(6):1521-1524. doi: 10.4269/ajtmh.18-1001.
- ¹⁴⁶ Seroprevalence of hepatitis B surface antigen (HBsAg) in Bo, Sierra Leone, 2012-2013. Ansumana R, Dariano DF, Jacobsen KH, Leski TA, Lamin JM, Lahai J, Bangura U, Bockarie AS, Taitt CR, Yasuda C, Bockarie MJ, Stenger DA. BMC Res Notes. 2018 Feb 8;11(1):113. doi: 10.1186/s13104-018-3218-8.
- ¹⁴⁷ Sero-prevalence of hepatitis B virus among middle to high socio-economic antenatal population in Sierra Leone. Wurie IM, Wurie AT, Gevao SM. West Afr J Med. 2005 Jan-Mar;24(1):18-20.
- ¹⁴⁸ Seroprevalence of hepatitis markers; HAV, HBV, HCV and HEV amongst primary school children in Freetown, Sierra Leone. Hodges M, Sanders E, Aitken C. West Afr J Med. 1998 Jan-Mar;17(1):36-7.
- ¹⁴⁹ The use of immunochromatography test cards in the diagnosis of hepatitis B surface antigen among pregnant women in West Africa. Torlesse H, Wurie IM, Hodges M. Br J Biomed Sci. 1997 Dec;54(4):256-9.
- ¹⁵⁰ Chronic Respiratory Diseases. World Health Organization. <https://www.who.int/respiratory/en/>. Accessed 4th August 2019.
- ¹⁵¹ Supplementary appendix 2 – Supplement to: Global, regional, and national incidence, prevalence and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 2018; 392: 1789-858. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators.
- ¹⁵² About Chronic Respiratory Diseases. World Health Organization. https://www.who.int/respiratory/about_topic/en/. Accessed 4th August 2019.
- ¹⁵³ DHIS2.0 analysis of 2018 NCD and general morbidity data – extracted 30 August 2018, see also Table 3 in section 0.
- ¹⁵⁴ Population prevalence was estimated using a projected population for 2017 using the medium variant option of 7,499,486 from the Sierra Leone 2015 Population and Housing Census – Thematic Report on Population Projections, Statistics Sierra Leone, October 2017
- ¹⁵⁵ Prevalence of diabetes in rural and urban populations in southern Sierra Leone: a preliminary survey. Ceesay MM, Morgan MW, Kamanda MO, Willoughby VR, Lisk DR. Trop Med Int Health. 1997 Mar;2(3):272-7.
- ¹⁵⁶ The prevalence of type 2 diabetes in urban Bo, Sierra Leone, and in the 16 countries of the West Africa region. Sundufu AJ, Bockarie CN, Jacobsen KH. Diabetes Metab Res Rev. 2017 Oct;33(7). doi: 10.1002/dmrr.2904. Epub 2017 Jun 16.
- ¹⁵⁷ Cardiovascular disease risk factors in the over 40s in rural and urban Bo, A household survey – Justine Davies and Maria Lisa Odland, Institute of Applied Health Research, University of Birmingham; Tahir Bockarie, University of Warwick; Haja Wurie, COMAHS; Rashid Ansumana, Njala University (Unpublished study, data collected in 2018, supported by Wellcome Trust).

- ¹⁵⁸ Diabetes Fact Sheet, World Health Organization, 30 October 2018. <https://www.who.int/news-room/fact-sheets/detail/diabetes>.
- ¹⁵⁹ Actual document not found. Quoted in 2019-2023 Mental Health Strategic Plan, Ministry of Health and Sanitation, Republic of Sierra Leone, May 2019.
- ¹⁶⁰ Traumatic injuries in developing countries: report from a nationwide cross-sectional survey of Sierra Leone. Stewart KA, Groen RS, Kamara TB, Farahzad MM, Samai M, Cassidy LD, Kushner AL, Wren SM. *JAMA Surg.* 2013 May;148(5):463-9. doi: 10.1001/jamasurg.2013.1341.
- ¹⁶¹ Burns in Sierra Leone: a population-based assessment. Wong EG, Groen RS, Kamara TB, Stewart KA, Cassidy LD, Samai M, Kushner AL, Wren SM. *Burns.* 2014 Dec;40(8):1748-53. doi: 10.1016/j.burns.2014.03.007. Epub 2014 Apr 24.
- ¹⁶² The burden of trauma presenting to the government referral hospital in Freetown, Sierra Leone: An observational study. Bundu I, Lowsby R, Vandy HP, Kamara SP, Jalloh AM, Scott COS, Beynon F.
- ¹⁶³ Personal communication from Dr. George T. Roberts, UK Chairman of the Sierra Leone Sickle Cell Society in May 2019. See also <http://www.sleonesickle.org/>.
- ¹⁶⁴ Kabia F, Tarawally U. Sierra Leone 2015 Population and Housing Census Thematic Report on Disability. 2017.
- ¹⁶⁵ Kamara JAL, Williams MLJ, Turay S, Sengeh P. 2004 Population and Housing Census: Analytical report on the Mortality and Disability status of the Population. 2006. https://www.statistics.sl/images/StatisticsSL/Documents/Census/2004/2004_population_and_housing_census_report_on_morbidity_and_mortality.pdf.
- ¹⁶⁶ Berghs M, Dos Santos-Zingale M. A Comparative Analysis: Everyday Experiences of Disability in Sierra Leone. *Afr Today.* 2014;58(2):18-40. doi:10.1353/at.2011.0044
- ¹⁶⁷ O'Sullivan C, Maclachlan M. Childhood Disability in Burkina Faso and Sierra Leone. In: Maclachlan M, Swartz L, eds. *Disability and International; Towards Inclusive Global Health.* ; 2009:161-175.
- ¹⁶⁸ Bah AJ, Idriss A, Wurie H, Bertone M, Elimian K. A Scoping Study on Mental Health and Psychosocial Support (MHPSS) in Sierra Leone.; 2018.
- ¹⁶⁹ Trani J-F, Bah O, Bailey N, Browne J, Groce N, Kett M. Disability In and Around Urban Areas of Sierra Leone.; 2010.
- ¹⁷⁰ Institute for Health Metrics and Evaluation. Global Burden of Disease Country Profile: Sierra Leone. 2017. <http://www.healthdata.org/sierra-leone>.
- ¹⁷¹ World Health Organization. Health Situation Analysis in the African Region. Geneva; 2016. <http://www.who.int/en/publication/5266/atlas-african-health-statistics-2016-health-situation-analysis-african-region>.
- ¹⁷² Murray-Zmijewski A. Sierra Leone FHCI Evaluation: Fiscal Space Analysis: FHCI and UHC.; 2016.
- ¹⁷³ Bah AJ, Idriss A, Wurie H, Bertone M, Elimian K. A Scoping Study on Mental Health and Psychosocial Support (MHPSS) in Sierra Leone.; 2018.
- ¹⁷⁴ Sierra Leone STEPS Survey 2009 – The Prevalence of the Common Risk Factors of Non-Communicable Diseases in Sierra Leone. No date. Ministry of Health and Sanitation.
- ¹⁷⁵ Sierra Leone STEPS Survey 2009 Fact Sheet. http://www.who.int/ncds/surveillance/steps/2009_Sierra_Leone_FactSheet_EN.pdf. WHO STEPS chronic disease risk factor surveillance. www.who.int/chp/steps.
- ¹⁷⁶ Investment Case for Tobacco Control in Sierra Leone: The case for scaling-up WHO FCTC implementation. Prepared by RTI International, Ministry of Health, Sierra Leone United Nations Development Programme, WHO FCTC Secretariat, World Health Organization, June 2019.
- ¹⁷⁷ For complete definitions of low and high levels of physical activity, other conditions are specified in the GPAQ Analysis Guide, available at <http://www.who.int/chp/steps/GPAQ/en/index.html>.
- ¹⁷⁸ Global recommendations on physical activity for health. World Health Organization. 2010.
- ¹⁷⁹ Harmful use of alcohol. Infographic. Accessed 5th November 2019: https://www.who.int/images/default-source/departments/substances-abuse/alcohol/infographics/alcohol-3-million-death-every-year.png?sfvrsn=8062967_2
- ¹⁸⁰ Factsheet healthy diet. World Health Organization. 23 October 2018. <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>
- ¹⁸¹ Factsheet salt reduction. World Health Organization. 30 June 2016. <https://www.who.int/news-room/fact-sheets/detail/salt-reduction>
- ¹⁸² Sierra Leone Micronutrient Survey 2013 (SLMS 2013). Ministry of Health and Sanitation (Sierra Leone), UNICEF, Helen Keller International and WHO. 2013. Freetown, Sierra Leone; 2015.
- ¹⁸³ Ambient air pollution: Health impacts. World Health Organization. <https://www.who.int/airpollution/ambient/health-impacts/en/>. Accessed 15th August 2019.
- ¹⁸⁴ Household air pollution: Health impacts. World Health Organization. <https://www.who.int/airpollution/household/health-impacts/en/>. Accessed 15th August 2019.
- ¹⁸⁵ Household air pollution: Pollutants. World Health Organization. <https://www.who.int/airpollution/household/pollutants/en/>. Accessed 15th August 2019.
- ¹⁸⁶ Joint effects of air pollution – Data by country. Public Health and environment section of the Global Health Observatory data repository. <http://apps.who.int/gho/data/view.main.SDGAIRBOD392v?lang=en>. Accessed 15th August 2019.

- ¹⁸⁷ WHO Global Ambient Air Quality Database (update 2018). https://www.who.int/airpollution/data/aap_air_quality_database_2018_v14.xlsx?ua=1 OR <https://whoairquality.shinyapps.io/AmbientAirQualityDatabase/>. Accessed 15th August 2019.
- ¹⁸⁸ WHO Global database of household air pollution measurements (update 2018). https://www.who.int/airpollution/data/HAP_Database_Version_4_2017.xlsx?ua=1 and <https://www.who.int/airpollution/data/hap-measurements/en/>. Accessed 15th August 2019.
- ¹⁸⁹ Impact of urban traffic on ambient air quality in Freetown. Environment Protection Agency Sierra Leone (EPA-SL), December 2015. Consultant: E.T. Taylor.
- ¹⁹⁰ Monitoring the levels of toxic air pollutants in the ambient air of Freetown, Sierra Leone
Eldred Tunde Taylor and Satoshi Nakai. *African Journal of Environmental Science and Technology* Vol. 6(7), pp. 283-292, July 2012
- ¹⁹¹ Characterization and Determination of PM_{2.5} Bound Polycyclic Aromatic Hydrocarbons (PAHS) in Indoor and Outdoor Air in Western Sierra Leone. Taylor ET, Wirmvem MJ, Sawyerr VH and Nakai S. *J Environ Anal Toxicol* 2015, Vol 5(5): 307 DOI: 10.4172/2161-0525.1000307
- ¹⁹² Prevalence of acute respiratory infections in women and children in Western Sierra Leone due to smoke from wood and charcoal stoves. Taylor ET, Nakai S. *Int J Environ Res Public Health*. 2012 Jun;9(6):2252-65. doi: 10.3390/ijerph9062252. Epub 2012 Jun 19.
- ¹⁹³ Diurnal concentrations and variation of carbon monoxide in indoor and outdoor air of residential homes in Western Sierra Leone. Taylor ET, Wirmvem MJ, Sawyerr VH, Nakai S. *Environment and Pollution* 2015 Vol.4 No.3 pp.10-18 ref.29
- ¹⁹⁴ The Levels of Toxic Air Pollutants in Kitchens with Traditional Stoves in Rural Sierra Leone
Eldred Tunde Taylor, Satoshi Nakai. *Journal of Environmental Protection*, 2012, 3, 1353-1363 1
<http://dx.doi.org/10.4236/jep.2012.310154> Published Online October 2012 (<http://www.SciRP.org/journal/jep>)
- ¹⁹⁵ Q&As on Hypertension. Updated September 2015. World Health Organization. <https://www.who.int/features/qa/82/en/>. Accessed 20th August 2019.
- ¹⁹⁶ A high prevalence of hypertension in rural Sierra Leone. Williams DE, Lisk DR. *West Afr J Med*. 1998 Apr-Jun;17(2):85-90.
- ¹⁹⁷ Blood pressure and hypertension in rural and urban Sierra Leoneans. Lisk DR, Williams DE, Slattery J. *Ethn Dis*. 1999 Spring-Summer;9(2):254-63.
- ¹⁹⁸ Predictors of Hypertension in a Population of Undergraduate Students in Sierra Leone. Lebbie A, Wadsworth R, Saidu J, Bangura C. *Int J Hypertens*. 2017; 2017:8196362. doi: 10.1155/2017/8196362. Epub 2017 Aug 3.
- ¹⁹⁹ Hypertension in Sierra Leone stroke population. Lisk DR. *East Afr Med J*. 1993 May;70(5):284-7.
- ²⁰⁰ Prevalence of hypertension in the Gambia and Sierra Leone, western Africa: a cross-sectional study. Awad M, Ruzza A, Mirocha J, Setareh-Shenas S, Pixton JR, Soliman C, Czer LS. *Cardiovasc J Afr*. 2014 Nov-Dec;25(6):269-78. doi: 10.5830/CVJA-2014-058. Epub 2014 Sep 29.
- ²⁰¹ Hypertension in Bo, Sierra Leone. Meehan KA, Bankoski AJ, Tejan E, Ansumana R, Bangura U, Stenger DA, Jacobsen KH. *Ethn Dis*. 2011 Spring;21(2):237-42.
- ²⁰² Preliminary data from: Prevalence of hypertension and its risk factors in western area urban, Freetown Sierra Leone: a hospital-based survey. Hassan Benya, Online MPH student at University of Roehampton in London. 2019. (unpublished).
- ²⁰³ CHO-MLTP - Community Health Officer-Management & Leadership Training Program. Case study. <https://www.ehealthafrica.org/community-health-officer-mltp>. Accessed 20th August 2019.
- ²⁰⁴ CHO-MLTP - Community Health Officer-Management & Leadership Training Program data, personal communication from Mr. Hassan Benya and Mr. Dennis Ocansey, CDC, 5th August 2019.
- ²⁰⁵ Obesity – Health Topic. World Health Organization. <https://www.who.int/topics/obesity/en/>. Accessed 20th August 2019.
- ²⁰⁶ Waist circumference and waist-hip ratio: report of a WHO expert consultation, Geneva, 8–11 December 2008. World Health Organization. 2011.
- ²⁰⁷ Prevalence and differentials of overweight and obesity in preschool children in Sub-Saharan Africa. Gebremedhin S. *BMJ Open*. 2015 Dec 23;5(12):e009005. doi: 10.1136/bmjopen-2015-009005.
- ²⁰⁸ Sierra Leone Demographic and Health Survey 2008. Statistics Sierra Leone (SSL) and ICF Macro. 2009. Calverton, Maryland, USA: Statistics Sierra Leone (SSL) and ICF Macro.
- ²⁰⁹ Sierra Leone Multiple Indicator Cluster Survey 2010, Final Report. Freetown, Sierra Leone: Statistics Sierra Leone and UNICEF-Sierra Leone. 2011.
- ²¹⁰ Sierra Leone National Nutrition Survey 2017. Ministry of Health and Sanitation (MoHS), Directorate of Food and Nutrition (DFN), Action Against Hunger and Irish Aid. 2017.
- ²¹¹ Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: report of a WHO/IDF consultation. World Health Organization & International Diabetes Federation. 2006.
- ²¹² Personal communication from Dr. Daniel Youkee, King's Sierra Leone Partnership.
- ²¹³ FoRUT website: <https://forut.sl/> accessed 10th February 2020.
- ²¹⁴ <http://www.thepatrioticvanguard.com/wes-strickland-and-the-village-medical-project-in-sierra-leone>